Experience in using ....

a diagram (Fig.3) where (1) is its spherical brass casing 180 mm in diameter, filled with lead, and (2) is the removable part containing the radioactive isotope (3) that is placed in a shell (4). The removable part rotates on ball bearings about its axis and is driven by a worm gear drive (5) actuated by a handle through a 2-m-long flexible shaft. Irradiation is only possible through the conical window (7) with an 80° opening. The radioactive preparation is moved into the center of the ball (as shown by dotted lines) for the time of transportation and storage so as to keep it enclosed in lead. Irradiation is possible also from the transport carriage. A special carriage (seen in photograph) has been built for welds inspection in large gas container shells. The carriage is standing on rails, and the container is rotated past it on a roller stand. A small protective casing from a different apparatus has to be used instead of the big new in spots not accessible for large casing, and a special lead cover is then placed over the small protective casing. The new apparatus is safe for operators and handy. There are 4 figures.

26488
S/125/61/000/009/013/014
D040/D113

Experience in using ....

ASSOCIATION: Dnepropetrovskiy savod metallokonstruktsiy im.Babushkina (Dnepropetrovsk Metal Structures Plant im.Babushkin)

SUBMITTED: April 20, 1961

Card 3/4

FEDORYUK, M. V. Cand Phys-Math Sci -- "Asymptotes of the Green function [redacted] with [redacted] $t \to +0, x \to \infty$ for correct (according to Petrovskiy) equations with constant coefficients, and classes of the correctness of solution of the Cauchy problem." Mos, 1960. (Voronezh State Univ) (KL, 1-61, 180)

22412

16.4100

S/042/61/016/001/006/007
C 111/ C 333

AUTHOR: Fedoryuk, M. V.

TITLE: On the asymptotic behavior of curve integrals

PERIODICAL: Uspekhi matematicheskikh nauk, v. 16, no. 1, 1961, 171-178

TEXT: Let the integral

$$I(\lambda) = \int_C g(z)\, e^{\lambda f(z)}\, dz \qquad (4)$$

be given, where λ is real and $\lambda \to +\infty$. The equipotential lines Re $f(z) = u(z) = c$ are assumed to subdivide the domain of analyticity of $f(z)$ into the domains $G_1, G_2, \ldots, G_{2n+1}$ which are separated from each other by the lines $l_1, \ldots, l_{2n+1}$. Assume that:

1°. In $G_1, G_3, \ldots, G_{2n+1}$ let $u(z) - c < 0$,
in $G_2, G_4, \ldots, G_{2n}$ let $u(z) - c > 0$;

2°. $f(z) \to c + id$ for $z \to \infty$ in $\bigcup_{i=1}^{2n+1} G_i$;

Card 1/4

3°. $g(z) = \sum_{n=0}^{\infty} a_n z^{-n}$ for large z in $\bigcup_{i=1}^{2n+1} G_i$, $a_o \neq 0$;

4°. $f'(z) \neq 0$ in the interior and on the boundary of $\bigcup_{i=1}^{2n+1} G_i$.

Let f(z) and g(z) be regular in $D \supset \bigcup_{i=1}^{2n+1} G_i$. The ends A_1 and A_2 of the curve C lie in G_1 and G_{2n+1}.

Theorem 1: After a rotation by the angle γ let

$$y = h_o(x),\ y = h_1(x),\ h_1(x) > h_o(x), \quad x > 0 \tag{5}$$

be the equations of l_1 and l_{2n+2}. Let denote

$$\Theta(x) = h_1(x) - h_0(x) \qquad \psi(x) = \frac{h_o(x) + h_1(x)}{2} . \tag{6}$$

If

On the asymptotic behavior of curve ...

$$\lim_{x \to +\infty} h_1'(x) = \lim_{x \to +\infty} h_0'(x) = \operatorname{tg} \gamma , \quad |\gamma| < \frac{\pi}{2} , \tag{7}$$

$$\lim_{x \to +\infty} \frac{\theta(x)\theta''(x)}{\theta'(x)} = 0; \tag{7'}$$

$$\int_{x_0}^{\infty} \frac{\theta'^2(x)}{\theta(x)} \, dx < \infty \tag{8}$$

then

$$\int_C g(z) \, e^{\lambda f(z)} dz \sim e^{i\gamma} e^{\lambda f(\infty)} \cdot i \, \frac{2n}{2n+1} \, a_0 \theta \left(\xi\left(\frac{1}{\lambda}\right) \right) \tag{9}$$

for $\lambda \to +\infty$, where $\xi(x)$ is the inverse function of

Card 3/4

$$-(2n+1)\pi \int_{x_0}^{x} \frac{1+\psi'^2(x)}{\theta(x)}\,dx$$

$$u_1(x) = e \qquad . \qquad (10)$$

The author thanks M. A. Yevgrafov for advices.

There is 1 Soviet-bloc and 1 non-Soviet-bloc reference. The reference to English-language publication reads as follows: S. E. Warschawski, On conformal mapping of infinite strips, Trans. Amer. Math. Soc. 51 (1942), 280-335.

SUBMITTED: March 14, 1959

FEDORUK, N.A.

Utilization of phagocyte index in the diagnosis of dysentery. Sovet. med. 16 no.3:26-27 Mar 1952. (CLML 22:1)

1. Of Moscow Oblast Institute of Epidemiology, Microbiology, and Infectious Diseases (Scientific Supervisor -- Prof. V. A. Krestovnikova) imeni I. I. Mechnikov.

FEDORUK, S.G.; ROMANYUK, V.K.; KOROBKA, I.A.

Combination of pernicious anemia with polyposis gastrica. Vrach. delo no.4:419 Ap '59. (MIRA 12:7)

1. Kafedra fakul'tetskoy terapii (zav. - prof. N.B. Shchupak) Chernovitskogo meditsinskogo instituta.
(ANEMIA) (STOMACH--TUMORS)

FEDORUK, S.G.

Patent ductus arteriosus complicated by exfoliating aneurysm of the pulmonary artery and its rupture. Vrach.delo no.2:195-196 F '60. (MIRA 13:6)

1. Gospital'naya terapevticheskaya klinika (zav. - prof. V.A. Triger) Chernovitskogo meditsinskogo instituta.
(DUCTUS ARTERIOSUS) (PULMONARY ARTERY--DISEASES)

NEMIROVSKIY, E.I., inzh.; FEDORUK, V.A., inzh.

Standardization of scrapers. Stroi.i dor.mashinostr. no.7: 21-23 Jl '59. (MIRA 12:11)
(Scrapers)

MEMIROVSKIY, E.I., inzh.; FEDORUK, V.A., inzh.

Letter to the editor. Stroi. i dor.mashinostr. 5 no.7:3 of cover Jl '60. (MIRA 13:7)
(Scrapes)

OKARA, V.G.; FEDORUK, V.M.; SHATAYLO, D.V.

Use of Eu-152/154 radioisotopes for the quality control of welded joints. Avtom.svar. 14 no.9:85-88 S '61. (MIRA 14:8)

1. Dnepropetrovskiy zavod metallokonstruktsiy imeni Babushkina.
(Welding--Quality control)
(Radioisotopes--Industrial applications)

SOV/109-4-8-1/35

AUTHORS: Kucherenko, Ye.T. and Fedorus, A.G.

TITLE: Energy Distribution of the Ions Obtained From a High-frequency Source

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1233 - 1237 (USSR)

ABSTRACT: The experiments described were carried out by means of a specially constructed device having a high evacuation velocity. The device is illustrated in Figure 1. The ion source was in the form of the quartz chamber 1 which was fixed to the metal flange 2 . The discharge chamber was furnished with an "extractor" system 3 whose dimensions were chosen in such a way that, for a minimum gas loss of 2 - 2.5 cm^3/h, it was possible to obtain a sufficiently intensive ion beam when the potential difference between the channel and the upper electrode was comparatively small. The energy analyser was in the form of a cylindrical condenser (Ref 9) having a resolving power $U/\Delta U > 100$. By employing this method with a discharge voltage of 3 kV, a sharp energy peak having a width of 25 - 30 eV was observed on the energy-

Card1/3

Energy Distribution of the Ions Obtained From a High-frequency Source

distribution curve. This is illustrated in Figure 2. The curve of Figure 2 was taken at a pressure $p = 4 \times 10^{-2}$ mm Hg (the gas being air) and a discharge current of 1.5 mA. A typical ion energy distribution curve for a discharge effected at 60 Mc/s is shown in Figure 3. The gas was hydrogen at a pressure of 2×10^{-2} mm Hg, the discharge was excited by means of a capacitance and the ion-"extraction" voltage was 1 920 V. The curve has a maximum which embraces about 80% of all the ions and the width of the maximum is about 50 V. It was found that a similar distribution curve is obtained when the discharge is excited by means of an inductance. The discharges were also investigated without employing the ion-"extracting" device. The results are illustrated in Figure 4. Curve 1 in the figure was taken when the discharge was excited by means of external electrodes, the gas being hydrogen, at a pressure of 10^{-2} mm Hg; Curve 2 was taken at the same pressure but

Energy Distribution of the Ions Obtained From a High-frequency Source

the discharge was excited inductively; Curve 3 was measured in a discharge at a pressure 1.5×10^{-2} mm Hg, the excitation being effected by means of internal electrodes.

The authors make acknowledgment to Professor N.D. Morgulis for discussions and his interest in this work.

There are 4 figures and 12 references, 7 of which are English, 2 German and 3 Soviet.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko, Kafedra elektroniki (Kiyev State University im. T.G. Shevchenko, Chair of Electronics)

SUBMITTED: March 5, 1959

ACC NR: AP6037061 SOURCE CODE: UR/0056/66/051/005/1332/1340

AUTHOR: Gavrilyuk, V. M. (deceased); Naumovets, A. G.; Fedorus, A. G.

ORG: Institute of Physics, Academy of Sciences, Ukrainian SSR (Institut fiziki Akademii nauk Ukrainskoy SSR)

TITLE: Investigation of adsorption of cesium on a tungsten single crystal

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 5, 1966, 1332-1340

TOPIC TAGS: cesium, tungsten, work function, adsorption, crystal surface, epitaxial growing, single crystal structure

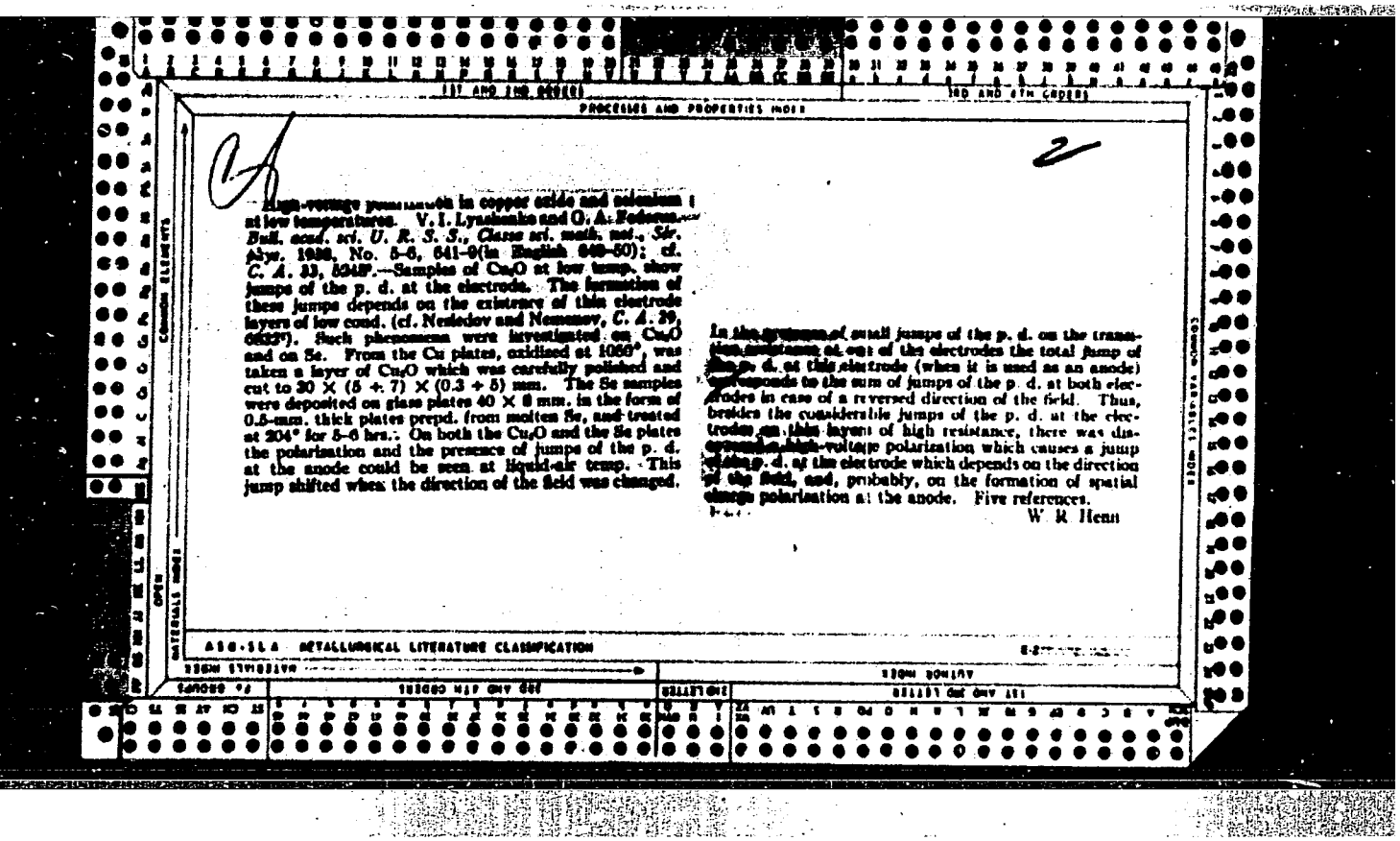
ABSTRACT: The purpose of the investigation was to obtain detailed quantitative data describing adsorption on substrates of known crystal structure, with emphasis on the cesium-tungsten system. To this end, the authors measured the work function for the (110), (112), (100), and (111) faces of a tungsten single crystal, as a function of the concentration of the cesium atoms adsorbed on the surface, by determining the field emission current from the individual faces in a Muller type electron projection tube. The experimental apparatus was similar to that used by the authors earlier for experiments with lithium on tungsten (FTT v. 8, 1821, 1966). The lowest work functions φ of the various faces are in the range 1.35 - 1.55 ev; the concentration in this case is respectively 2.6×10^{14}, 3.2×10^{14}, 3.8×10^{14}, and 4.0×10^{14} at/cm^2 for the (100), (110), (112), and (111) planes respectively (the accuracy is 0.1 ev).

ACC NR: AP6037061

The effect of the structure and of the work function of the substrate on the shape of the $\varphi(n)$ curve is discussed. The adsorption characteristics of cesium and lithium on tungsten are compared. Whereas in the case of cesium a correlation is observed between $d\varphi/dn$ and φ, no such correlation is observed for lithium. The results also show that the role of the atomic structure of the surface increases markedly at high adsorbed atom concentrations, when two-dimensional epitaxial crystals of the adsorbate are produced. It is concluded that a knowledge of the structure of the films is just as important for a correct understanding of the mechanism of adsorption as a knowledge of the structure of the substrate. Orig. art. has: 4 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 09Jun66/ ORIG REF: 011/ OTH REF: 008

Card 2/2



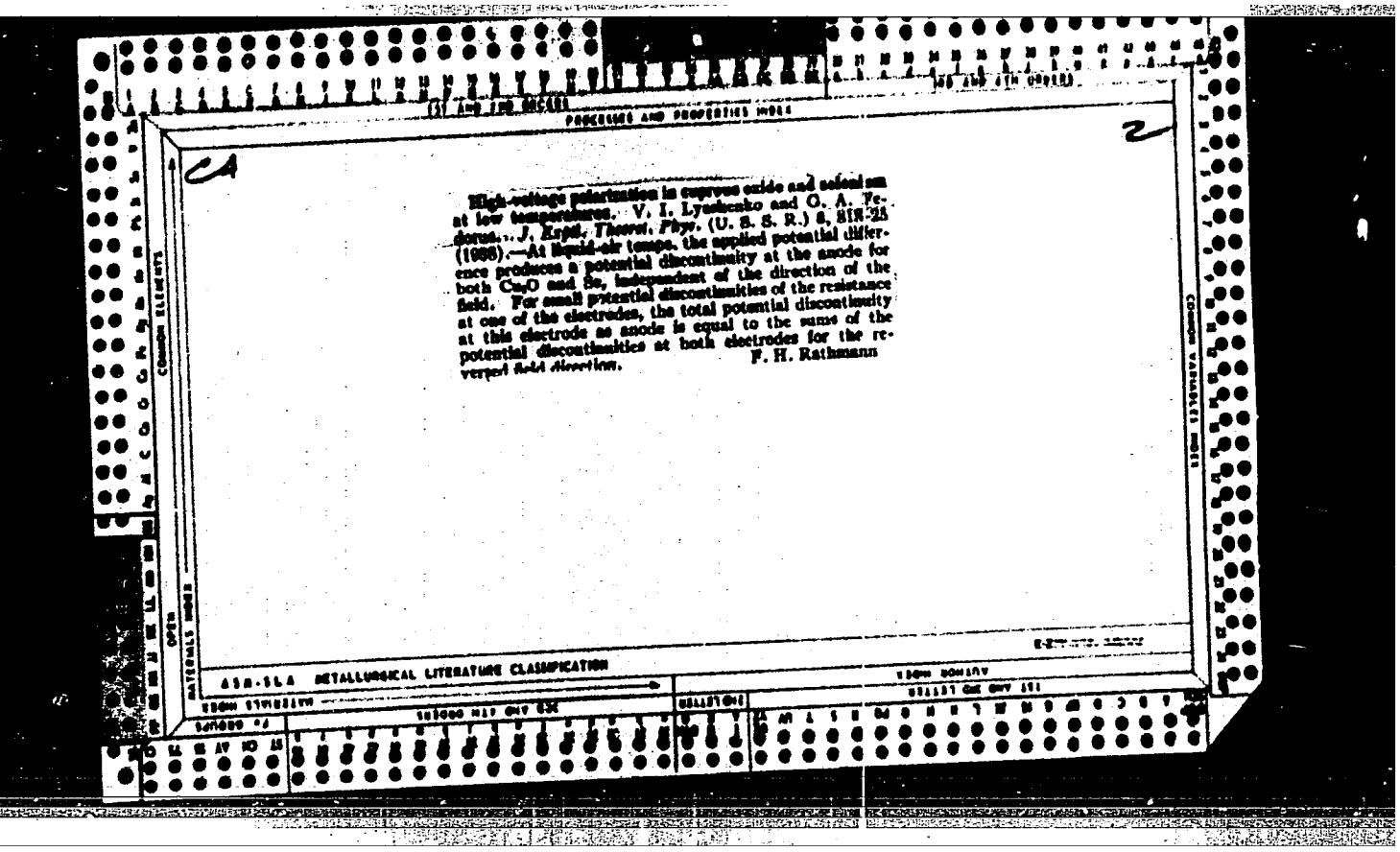
PROCESSES AND PROPERTIES INDEX

2

High-voltage [illegible] in copper oxide and selenium [illegible] at low temperatures. V. I. Lyashenko and O. A. Fedorus. *Bull. acad. sci. U. R. S. S., Classe sci. math. nat., Sér. Phys.* 1938, No. 5-6, 641-9(in English 649-50); cf. *C. A.* 33, 8048F.—Samples of Cu_2O at low temp. show jumps of the p. d. at the electrode. The formation of these jumps depends on the existence of thin electrode layers of low cond. (cf. Nesterov and Nemenov, *C. A.* 29, 6623[illegible]). Such phenomena were investigated on Cu_2O and on Se. From the Cu plates, oxidized at 1050°, was taken a layer of Cu_2O which was carefully polished and cut to 30 × (5 ÷ 7) × (0.3 ÷ 5) mm. The Se samples were deposited on glass plates 40 × 8 mm. in the form of 0.5-mm. thick plates prepd. from molten Se, and treated at 204° for 5–6 hrs. On both the Cu_2O and the Se plates the polarization and the presence of jumps of the p. d. at the anode could be seen at liquid-air temp. This jump shifted when the direction of the field was changed. In the presence of small jumps of the p. d. on the transition resistance at one of the electrodes the total jump of the p. d. at this electrode (when it is used as an anode) corresponds to the sum of jumps of the p. d. at both electrodes in case of a reversed direction of the field. Thus, besides the considerable jumps of the p. d. at the electrodes on this layers of high resistance, there was discovered high-voltage polarization which causes a jump [illegible] p. d. of the electrode which depends on the direction of the field, and, probably, on the formation of spatial charge polarization at the anode. Five references.

W. R. Henn

A 50-51 A METALLURGICAL LITERATURE CLASSIFICATION



High-voltage polarization in cuprous oxide and selenium at low temperatures. V. I. Lyashenko and O. A. Fedorus. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 8, 818-25 (1938).—At liquid-air temps. the applied potential difference produces a potential discontinuity at the anode for both Cu_2O and Se, independent of the direction of the field. For small potential discontinuities of the resistance at one of the electrodes, the total potential discontinuity at this electrode as anode is equal to the sums of the potential discontinuities at both electrodes for the reversed field direction. F. H. Rathmann

Materials & Subsidiary Techniques

1E

1816

537.311.33 : 621.315.59

Experimental Investigation of the Metal-Semiconductor Contact.—V. I. Lyashenko, G. A. Fedorus & S. P. Yelvakhtkova. (*Bull. Acad. Sci. U.R.S.S., sér. phys.*, 1941, Vol. 5, Nos. 4/5, pp. 431-441. In Russian with English summary.) An investigation for cuprous oxide and selenium of the relation between metal-semiconductor contact potential difference and field strength, current density, and conductivity. The potential difference at first increases almost linearly with current density, then attains a maximum, and finally falls to zero. The smaller the conductivity of the specimen, the larger the potential difference.

The explanation suggested is that the flow of current reduces the "holes" concentration in the layer of chemically uniform semiconductor near a contact. The experimental data agree fairly well with S. I. Pekar's theoretical results (1819 below).

FEDORUS, G. A.

USSR/Physics - Photoconductivity, Photoresistors

"Nonlinear Photoconductivity of PbS-Photoresistors," V. Ye. Lashkarev, I. R. Potapenko, G. A. Fedorus, Inst of Phys, Acad Sci Ukrainian SSR, 12 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 10, 1949

Studied kinetics of photoconductivity of PbS-photoresistors within a wide range of temperatures and illumination. Compared experimental data with theory developed by Lashkarev. Established mechanism of nonlinear photoconductivity kinetics for PbS-photoresistors. Submitted 17 May 49.

PA 150T79

NON-LINEAR PHOTOCONDUCTIVITY OF CUPROUS OXIDE. V.R. LASHKAPEV AND G.A.FEDORUS (C.R. ACAD. SCI. URSS. 1949, 64, 195-198)--A relation is found between the non-linear effect of photoconductivity and the life-time of the carriers of photo-current. The non-linearity of the photocurrent is easily followed on a specimen of Cu2O not submitted to ignition in vac. Impulses of light of 2X10-2 sec. dura-tion were followed by lengthy periods of darkness. The changes of conductivity were measured by photographs of the oscillograph screen. Steeply increasing curves of photocurrent occur, followed by an exponential decrease in darkness. The first part shows saturation at high light-intensity. The decrease in dark-ness depends only on time. It seems that the non-linearity of the photocurrent is due to the influence of light on the life-time of the carriers. This influence is the greater the longer the life-time of the carriers. The mechanism of the effect may consist in light shifting electrons from levels with long lives to the levels with short lives. When a specimen of Cu2O is ignited in vac. the long-life components of the photocurrent disappear and the photocurrent becomes linear for the large interval of intensities of light and shows a very short life-time.

S.M. Rybicka.

Immediate source clipping

Physics Inst Acad Sci Ukr SSR

FEDORUS, G. A.

11 Oct 51

USSR/Physics - Photoconductivity

"Photoresistances of CdS Monocrystals and Their Photoactivation," V. Ye. Lashkarev, Acting Mem, Acad Sci Ukrainian SSR, V. S. Medvedev, A. I. Skopenko, G. A. Fedorus, M. K. Sheynkman, Inst of Phys, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 86, No 5, pp 905-907

At 7th Conference of Semiconductors in 1950 (cf. Lashkarev et al., "Iz AN SSSR, Ser Fiz" 16, 81 (1952) Photoactivity of CdS monocrystals was reported activated by light. Show that photoresistance of CdS is only one exhibiting, in addition to high sensitivity, practically horizontal spectral characteristics within band 0.4 to 0.21u. Received 5 Aug 52

PA 245T94

FEDORUS, G. A.

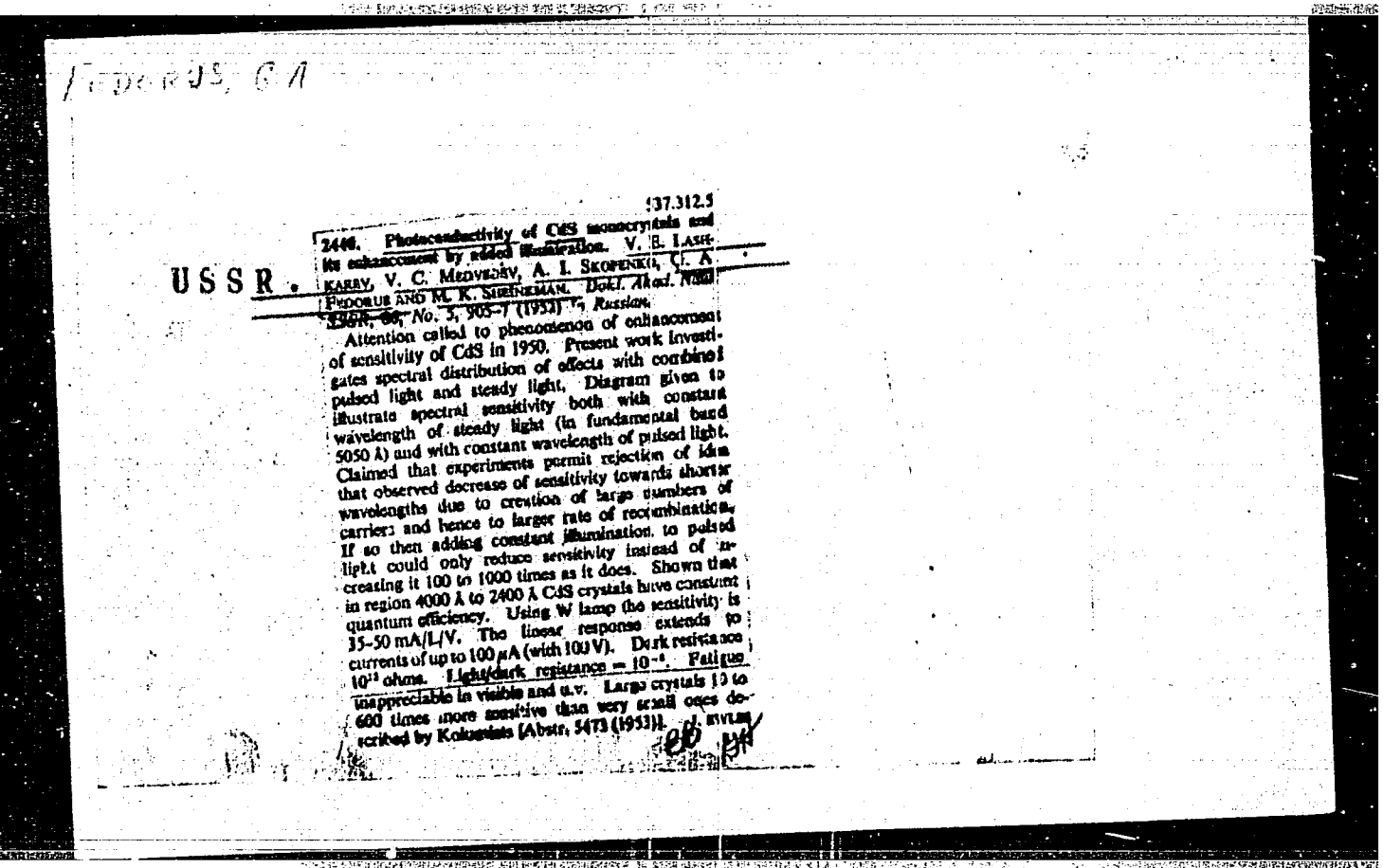
USSR/Physics - Semiconductors Jan/Feb 52

"Some Peculiarities in the Photoconductivity of CdS Monocrystals," V. Ye. Lashkarev, G. A. Fedorus, Inst of Phys, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Fiz" Vol XVI, No 1, pp 81-92

Interest in subject was stimulated by work of R. Frerichs (Phys Rev 72, 594, 1947). Author describes his exptl investigations concerning detn of sign of current carriers, relation of photocurrent to illumination, kinetics of inertial component, output of photocurrent, etc. Indebted to A. I. Skopenko.

218T89



FEDERUS, G A

USSR

537.312.5

2446. Photoconductivity of CdS monocrystals and its enhancement by added illumination. V. B. LASH-KAREV, V. C. MEDVEDEV, A. I. SKOPENKO, G. A. FEDORUS AND M. K. SHEINKMAN. *Dokl. Akad. Nauk SSSR*, 86, No. 5, 905–7 (1952) In *Russian*.

Attention called to phenomenon of enhancement of sensitivity of CdS in 1950. Present work investigates spectral distribution of effects with combined pulsed light and steady light. Diagram given to illustrate spectral sensitivity both with constant wavelength of steady light (in fundamental band 5050 Å) and with constant wavelength of pulsed light. Claimed that experiments permit rejection of idea that observed decrease of sensitivity towards shorter wavelengths due to creation of large numbers of carriers and hence to larger rate of recombination. If so then adding constant illumination to pulsed light could only reduce sensitivity instead of increasing it 100 to 1000 times as it does. Shown that in region 4000 Å to 2400 Å CdS crystals have constant quantum efficiency. Using W lamp the sensitivity is 35–50 mA/L/V. The linear response extends to currents of up to 100 μA (with 100 V). Dark resistance 10^{13} ohms. Light/dark resistance = 10^{-4}. Fatigue inappreciable in visible and u.v. Large crystals 10 to 600 times more sensitive than very small ones described by Kokoulin [Abstr. 5473 (1953)]. J. HYLAS

20-114-6-18/54

AUTHORS: Lashkarev, V. Ye., Member of the Academy of Sciences of the Ukrainian SSR, Sal'kov, Ye. A., Fedorus, G. A., Sheynkman, M.K.

TITLE: The Shape of the Spectral Distribution of Photoconductance by Single Crystals of CdS (O forme spektral'nogo raspredeleniya fotoprovodimosti monokristallov CdS)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol.114, Nr 6, pp.1203-1205 (USSR)

ABSTRACT: The experiments were carried out with monocrystals of Cd which were obtained by a synthesis of Cd vapors and sulfur. The electrodes were produced by vaporizing of indium in vacuo. A UM-2 monochromator with a special incandescent lamp (340 Watt) served as light source. The spectral characteristic of the photocurrent was determined at stationary illumination of the sample. The investigation of the spectral dependence of the proper time of the photocarrier is also described here. The authors shortly discuss the measurements of the following quantities: momentary proper time τ^0 of the decrease of the photocurrent at the moment of the emission of light, the yield of the photocurrent a_0, the mobility of the photocarrier.

Card 1/3

The Shape of the Spectral Distribution of Photoconductance by Single Crystals of CdS

The measurements of the reflection coefficient showed that on transition to a strongly absorbable light the reflection coefficient does practically not change at all and that its value in the range of proper absorption does not exceed 20 %. At a maximum of the photocurrent the curve $\tau^{o}(\lambda)$ has a minimum. The spectral dependences $a_o(\lambda)$ and $a_d(\lambda)$ (the latter apparently means the differential yield) have a character analogous to the dependence of the photocurrent $I_\Phi(\lambda)$, where the maximum is most clearly marked off at $a_d(\lambda)$. The here obtaind dependences $a_o(\lambda)$ and $a_d(\lambda)$ can be explained on the basis of the exiton mechanism of photoconductivity in CdS monocrystals. The cause of the decrease of the photocurrent within the range of main absorption of the lattice in the CdS monocrystals is the decrease of the yield of the photocurrent, but not the decrease of the eigen time of the carrier. There are 3 figures and 10 references, 2 of which are Slavic.

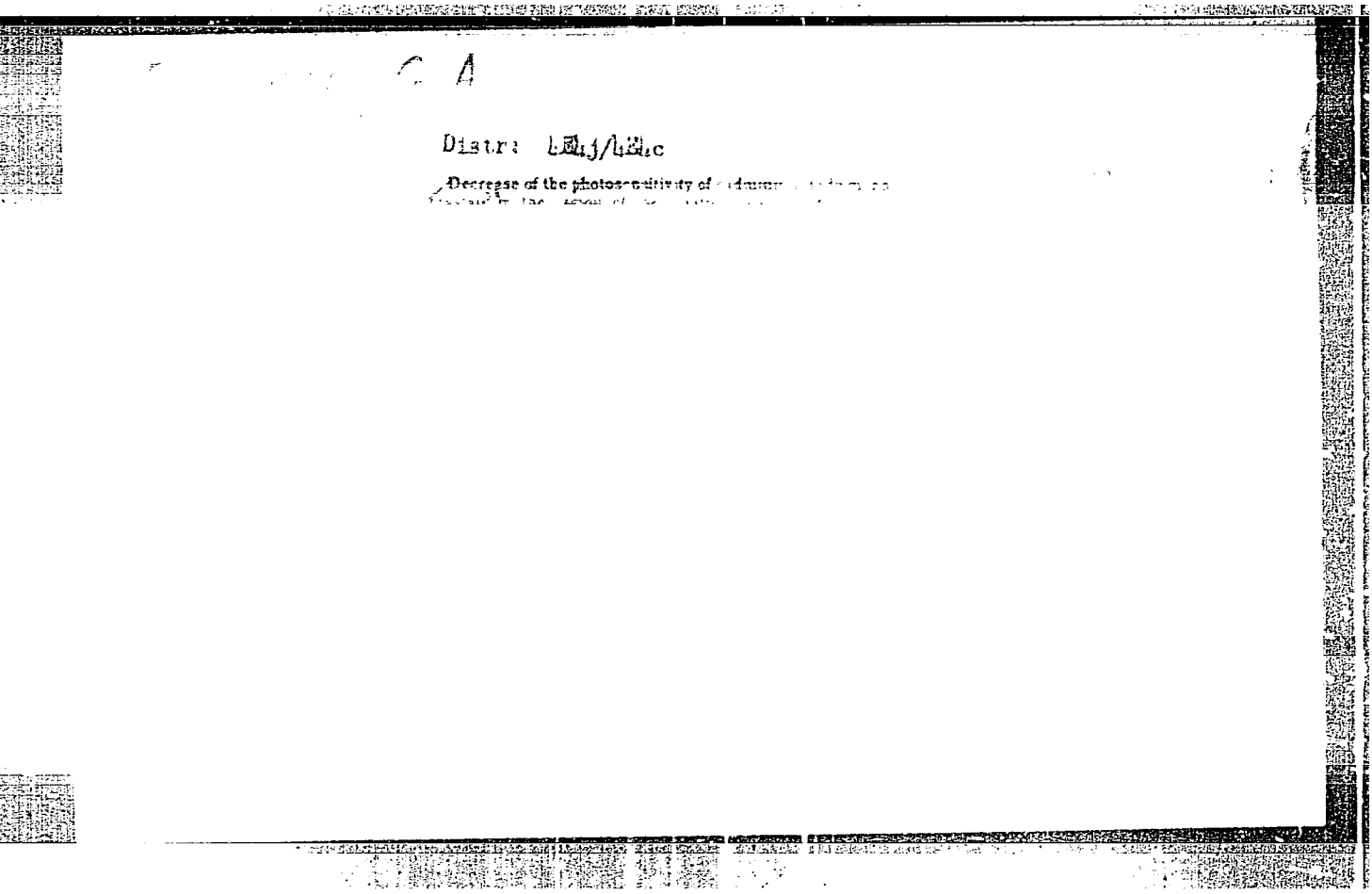
ASSOCIATION: Institute for Physics of the AS Ukrainian SSR
(Institut fiziki Akademii nauk USSR)

20-114-6-18/54

The Shape of the Spectral Distribution of Photoconductance by Single Crystals of CdS

SUBMITTED: February 21, 1957

Card 3/3



Distr: [illegible]c

Decrease of the photosensitivity of [illegible]

FEDORUS G.A.

LASHKAROV, V.Ye. [Lashkar'ov, V.IE.]; FEDORUS, G.A. [Fedorus, H.A.]; SHEYNKMAN, M.K.

Diffusion of photocarriers in CdS single crystals. Ukr. fiz. zhur. 2 no.4:374-375 O-D '57. (MIRA 11:3)

1. Institut fiziki AN URSR.
(Cadmium sulfide--Electric properties) (Photoconductivity)

FEDORUS, G.A.

LASHKAREV, V.Ye.; SAL'KOV, Ye.A.; FEDORUS, G.A.; SHEYNKMAN, M.K.

Shape of the spectral distribution of photoconductance in CdS single crystals. Dokl. AN SSSR 114 no.6:1203-1205 Je '57. (MLRA 10:9)

1. Akademik Akademii nauk USSR (for Lashkarev). 2. Institut fiziki Akademii nauk USSR.
(Cadmium sulfide) (Photoconductivity)

FEDORUS, G. A.

LASHKAREV, V.Ye. [Lashkar'ov, V.IE]; SAL'KOV, Ye.A. [Sal'kov, IE.A.]; FEDORUS, G.A. [Fedorus, H.A.]; SHEYNKMAN, M.K.

Study of the spectral characteristics of cadmium selenide crystals [in Ukrainian with summary in English]. Ukr. fiz. zhur. 3 no.2: 204-215 Mr-Ap '58. (MIRA 11:6)

1.Institut fiziki AN URSR.
(Cadmium selenide--Spectra) (Photoelectricity)

TROFIMENKO, A.P.; FEDORUS, G.A. [Fedorus, H.A.]

Thermoelectric current in CdS single crystals [with summary in English]. Ukr.fiz.zhur. 3 no.4:468-474 Jl-Ag '58. (MIRA 11:12)

1. Institut fiziki AN USSR.
(Cadmium sulfide) (Thermoelectricity)

TROFIMENKO, A.P.; FEDORUS, G.A. [Fedorus, H.A.]

Effect of annealing and of some impurities on the dark resistance and photosensitivity of CdS monocrystals. Ukr. fiz. zhur. 3 no.6: 839-841 N-D '58. (MIRA 12:6)

1. Institut fiziki AN USSR.
(Cadmium sulfide--Optical properties)
(Cadmium sulfide--Electric properties)

26.2532
9,4160

38163
S/058/62/000/004/054/160
A058/A101

AUTHORS: Gal'kov, Ye. A., Fedorus, G. A.

TITLE: Photovaristors prepared from CdSe single crystals with short relaxation times

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 22, abstract 4G181, (V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh". Kiev, AN USSR, 1959, 373-376)

TEXT: The authors report on some peculiarities of CdSe photovaristors subjected to heat treatment (annealing at 650°C, pressure of 10^{-4} mm Hg in a quartz tube for 30 min), ensuring short photocurrent relaxation times. It is pointed out that the changes caused by heat treatment in the photoelectric properties of CdSe single crystals are irreversible.

[Abstracter's note: Complete translation]

Card 1/1

SAL'KOV, Ye.A.; FEDORUS, G.A.; SHEYNKMAN, M.K.

Effect of surface processing on some photoconductivity characteristics of CdS monocrystals. Fiz. tver. tela 1 no.4:579-582 '59.
(MIRA 12:6)

1.Institut fiziki AN USSR, Kiyev.
(Cadmium sulfide crystals) (Photoconductivity)

41073

24.2600, 9.4177

S/058/62/000/008/082/134
A062/A101

AUTHORS: Sal'kov, Ye. A., Fedorus, G. A.

TITLE: On the generation of photocurrent oscillations in monocrystalline CdS and CdSe photoresistors

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1962, 30, abstract 8E220 (In collection: "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959, 96 - 98)

TEXT: It has been found that on monocrystalline CdS and CdSe photoresistors the photocurrent is modulated by periodical oscillations whose amplitude oscillates from a fraction of one per cent to 60% of the general level of the photocurrent. The shape and the frequency of the oscillations greatly depend on the magnitude of the voltage applied to the specimen, on the intensity and on the spectral composition of the illuminating light. The frequencies of the observed oscillations depend on the material of the specimen, are correlated with the volume relaxation time of photoconductivity and comprised in the range from a fraction of a cps to 100 kc. A necessary (but not sufficient) condition of the

Card 1/2

generation of oscillations is the presence of a non-linear voltage dependence of the photocurrent. The shape and the frequency of the oscillations do not depend on the electrical parameters of the measuring circuit. It is supposed that the oscillation generation phenomenon is connected in the first place with the processes occurring on the metal-semiconductor contact, although volume properties play therein a rather important part.

O. Shustova

[Abstracter's note: Complete translation]

81630
S/181/60/002/06/18/050
B122/B063

24.7600

AUTHORS: Trofimenko, A. P., Fedorus, G. A., Razmadze, A. K.

TITLE: Some Peculiarities of the Thermal Stimulation of the Conductivity of CdS Single Crystals

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 6, pp. 1141 - 1147

TEXT: The article under review deals with the following problems of the above-mentioned subject: recombination and filling up of electron traps at the maximum of thermally stimulated conductivity (TSC), the part played by the surface in this connection, and the possible relationship between the photoconductivity of CdS single crystals and the area of the TSC curve. TSC was measured by means of an apparatus described in the paper of Ref. 7. The specimens were exposed to white light, the wavelengths $\lambda > 0.8\ \mu$ being excluded. Beside samples with a pure stoichiometrical ratio of the components, the authors studied such with an excess of one component. The measurements obtained were in full agreement with those already described in Ref.7. At a Cd excess, peaks were observed in the range of -195 to -180°C, and at

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Some Peculiarities of the Thermal Stimulation of the Conductivity of CdS Single Crystals

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only a slight Cd excess, also a peak in the range of 15 - 25°C, at an S excess a number of peaks, the highest peak at 0 - 6°C. From the results obtained here and from further investigations on the temperature dependence of the adhesion cross section of the excess component $\sigma(T)$ the attempt was made to determine the depth of the levels caused by the excess. Experiments were made at higher temperatures on CdS(Au) and CdS(S) crystals which were kept at low temperatures and were then hardened. In these crystals, the plane bounded by the TSC curve is completely independent of temperature. Such a dependence was, however, established on the CdS(S) single crystal (Fig. 1). A maximum filling of the traps with electrons at the various illumination conditions takes place at -65 to -50°C. $\sigma(T)$ drops exponentially with all crystals, which fact is ascribed to the necessity of surmounting a potential threshold in these crystals. At high temperatures as well it is possible to observe a decrease in the filling of the local levels, but no explanation could be provided for this. Experiments made on the determination of the filling degree at temperatures of the TSC maximum ($\bar{T}$) (Fig. 3) showed the recombination taking place to be predominantly monomolecular. Experiments made on the dependence of the TSC on the wavelength of light

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Some Peculiarities of the Thermal Stimulation of the Conductivity of CdS Single Crystals

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revealed a decrease in the maxima with strong light absorption. This was best observed on CdS(S). A special treatment of the surface (short etching with HCl) did not appreciably change the TSC peaks nor photosensitivity, and new maxima did not arise. This shows that the impurities on the crystals did not form any surface film, but that they penetrate into the crystals. The influence of mica discharge manifested itself by a considerable enlargement of the areas of the TSC curves, a strong increase in light sensitivity and by the appearance of a strongly retarded quasi-dark conductance (Fig. 4', the peak becomes very much larger). The determination of the level depth is rendered more difficult in this connection. The study of a dependence between TSC curve areas and photosensitivity revealed (data in a table) that samples undergoing the same treatment exhibit the same relation between the quantities mentioned. A rigorous correlation between the two quantities can be set up only under consideration of the lifetime of electrons in the conduction band. Still, it was possible to establish a certain dependence of the photosensitivity on the concentration of the local levels in the outer part of the forbidden zone. The authors finally thank Professor V. Ye. Lashkarev, Academician of the AS UkrSSR for having supervised the work. There are 4 figures, 1 table, and 14 references:

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Some Peculiarities of the Thermal Stimulation of the Conductivity of CdS Single Crystals

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B122/B063

7 Soviet and 2 German.

ASSOCIATION: Institut fiziki AN USSR, Kiyev (Institute of Physics of the AS UkrSSR, Kiyev)

SUBMITTED: July 21, 1959

Card 4/4

FEDORUS, G.A

82549

S/181/60/002/007/029/042
B006/B060

24.7700

AUTHORS: Sal'kov, Ye. A., Fedorus, G. A.

TITLE: Investigation of the Lux-ampere Characteristics of CdS Single Crystals

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1576-1580

TEXT: In order to clarify the causes of linearity of lux-ampere characteristics, the authors examined lux-ampere characteristics of various types (sublinear, linear, and superlinear curves). The experiments were made with CdS single crystals. The photocurrent yield, a_d, was measured by means of light pulses of a duration of 30 μsec and dark intervals of 10 msec. The maximum intensity of illumination was $\simeq 10^{13}$ quanta/sec with λ = 5300 A. In addition to the lux-ampere characteristic $I_{ph}^{st}(L)$, the authors measured $a_d(L)$ and the dependence of the photocarrier lifetime on the intensity of illumination $\tau^o(L)$, for more than 30 samples. Five of these samples subjected to a special heat treatment showed a high trap concentration. The

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results of measurements on normal samples are illustrated in Figs. 1-4. Fig. 5 shows $I_{ph}^{st}(L)$, $\tau^{o}(L)$, and $a_d(L)$ for two samples with high trap concentrations. Here, the curves $I_{ph}^{st}(L)$ and $a_d \tau^{o} L$ are not parallel due to the distortion of $\tau^{o}(L)$ by the traps. Moreover, I_{ph}^{st}, $\tau_{i.r.}$, τ^{o}, a_d, and $a_{i.r.}$ were studied as a function of the carrier concentrations n. Fig. 6 shows the curves obtained (straight lines): $I_{ph}^{st} \sim L \sim n$. The infrared quenching of the photocurrent is related to the considerable decrease of the photocurrent yield and the carrier lifetime. It is shown that the results of these investigations contradict the hypotheses of Rose (Ref. 2) and Bube (Ref. 6), who assumed that the course of lux-ampere characteristics may be explained by the constancy of the photocurrent yield. The linearity of these curves has to be explained primarily by the hypothesis of the exciton mechanism of photoconductivity (hypothesis of triple impact, Ref. 4). Finally, the authors thank M. K. Sheynkman for his discussions. There are 6 figures and 6 references: 4 Soviet and 2 US.

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82549

Investigation of the Lux-ampere Characteristics of CdS Single Crystals

S/181/60/002/007/029/042
B006/B060

ASSOCIATION: Institut fiziki AN USSR Kiyev
(Institute of Physics of the AS UkrSSR, K.yev)

SUBMITTED: October 17, 1959

Card 3/3

FEDORUS, G.A.

PHASE I BOOK EXPLOITATION SOV/4966

Soveshchaniye po poluprovodnikovym materialam. Moscow, 1957

Voprosy metallurgii i fiziki poluprovodnikov; trudy 3-go soveshchaniya. (Problems in the Metallurgy and Physics of Semiconductors; Transactions of the Third Conference) Moscow, Izd-vo AN SSSR, 1959. 129 p. Errata slip inserted. 3,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni A. A. Baykova. Resp. Ed.: N. Kh. Abrikosov, Doctor of Chemical Sciences; Ed. of Publishing House: P. V. Zolotov.

PURPOSE: This collection is intended for technical and scientific personnel concerned with the investigation and production of semiconductor materials. It may also be used by students in schools of metallurgy.

COVERAGE: The collection contains reports submitted at the Third Conference on Semiconductor Materials, held at the Institute of Metallurgy imeni A. A. Baykov, AS USSR, Moscow, in May 1957. The reports deal with problems of obtaining and investigating germanium, silicon, and semiconductor compounds. The collection was first edited by D. A. Petrov, Doctor of Technical Sciences. References accompany most of the reports.

AVAILABLE: Library of Congress

Card 5/5

JP/dfk/os
3/30/61

GOLYNNAYA, G.I.; FEDORUS, G.A.; SHNYNKMAN, M.K.

The FSK-M1 cadmium-sulfide photoresistors with improved contacts. Prib.i tekh.eksp. no.4:141-143 Jl-Ag '60. (MIRA 13:9)

1. Institut fiziki AN USSR.
(Photoelectric cells)

87382

S/120/60/000/004/024/028
E073/E435

9,4160 (3201, 1003, 1105)

AUTHORS: Golynnaya, G.I., Fedorus, G.A. and Sheynkman, M.K.

TITLE: Sulphur-Cadmium Photoresistances СК-М1 (FSK-M1) With Improved Contacts

PERIODICAL: Pribory tekhnika eksperimenta, 1960, No.4, pp.141-142

TEXT: The developed technology of producing electrodes on CdS, CdSe and CdSe-CdSe single crystals consists of treating the sub-electrode surface of the crystal in a glow discharge prior to depositing the metal (Ref.2). The discharge is produced between two aluminium discs, under a vacuum hood or in the case of special cuts in air at a pressure of 10^{-1} to 10^{-2} mm Hg. The crystals are placed on the lower disc and are in electrical contact with it. After treating the crystals in the discharge for several minutes with an average discharge current density of several tens of mA/cm^2 the vacuum is increased to 10^{-5} to 10^{-6} mm Hg col, and the aluminium electrodes are deposited on the surface of the crystals by evaporation. Aluminium deposited by evaporation bonds closely to the surface of the crystal and to the mica to which the crystal is glued, it is mechanically strong and will not corrode in air, even at elevated temperatures. Investigation of the physical

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E073/E435

Sulphur-Cadmium Photoresistances ФСК-М1 (FSK-M1) With Improved Contacts

properties of the new contacts (Ref.2) has shown that at the contact surfaces a layer of a strongly reduced resistance (anti-negative layer) is formed, which ensures a linear and non-unipolar volt-ampere characteristic, a low level of contact noise and stability. The causes of formation of the anti-negative layer are discussed. Fig.1 shows the volt-ampere characteristics of CdS and CdSe single crystals in the temperature range +20 to +80°C for a DC voltage. Curves 1 and 2 refer to CdS; Curves 3, 4, 5 and 6 refer to CdSe (I - III - +U; II - IV - -U). Fig.2 shows the volt-ampere characteristics of CdS and CdSe single crystals at -1 to 60°C for d.c. voltage (1 - +U, 2 - -U). The volt-ampere characteristics of the d.c. photo current of CdSe single crystals are linear in the case of low voltages; experiments have shown that the observed saturation of the photo current (maximum, with a decrease at higher voltages) is due to heating up of the crystal by the photo current. Therefore, the linear part of the volt-ampere characteristics can be increased to 100 to 150 V by reducing the

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E073/E435

Sulphur-Cadmium Photoresistances ФСК-М1 (FSK-M1) With Improved Contacts

illumination of the crystal. The photoresistances FSK-M1 produced by IFAN UkrSSR are supplied only with aluminium contacts produced according to the here-described method. There are 2 figures and 4 references (Soviet).

ASSOCIATION: Institut fiziki AN UkrSSR
(Institute of Physics AS UkrSSR)

SUBMITTED: May 27, 1959

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67382

S/120/60/000/004/024/028
E073/E435

Sulphur-Cadmium Photoresistances ФСК-М1 (FSK-M1) With Improved Contacts

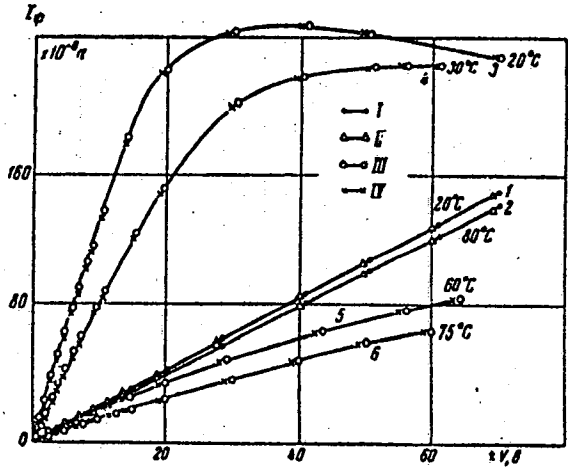

Fig.1.

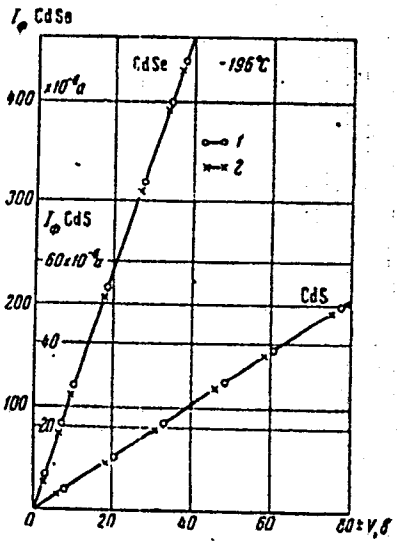

Fig.2.

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86804

7.4160 (3201, 1003, 1105)
26 1512

S/185/60/005/001/002/018
A151/A029

AUTHORS: Trofimenko, A.P.; Fedorus, G.A.

TITLE: Investigation of the Times of Decrease of the Photocurrent in CdS Single Crystals at Various Temperatures and Lighting Conditions

PERIODICAL: Ukrayins'kyy Fizychnyy Zhurnal, 1960, Vol. 5, No. 1, pp. 12 - 25

TEXT: An investigation of the times of decrease of photoconductivity after switching the light off was carried out on a number of CdS single crystals within a wide temperature range and at various lighting conditions of the samples. During all the measuring operations the lighting of the samples was effected by rectangular light pulses, an incandescence lamp serving as the light source. All rays with a wave length of more than 8 μ which could have caused an extinction of the photoconductivity were eliminated. The maximum lighting was estimated according to the value of the short circuit current of a germanium photodiode and equalled approximately 10^{18} quant/sec. Gray neutral filters helping to decrease the lighting on the samples by 10^6 times served for the weakening of light. The times of the photocurrent drop after the sample was darkened, were measured under three different conditions: the quasistationary, single pulse and repeated pulse condition. In the course of the investigation it was ascertained that various

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86804

S/185/60/005/001/002/018
A151/029

Investigation of the Times of Decrease of the Photocurrent in CdS Single Crystals at Various Temperatures and Lighting Conditions

types of annealing and the impurities introduced into the CdS single crystals have an essential effect on the time value of the photocurrent drop. The following conclusions were drawn: a) depending on measuring conditions, the time of the photocurrent drop can change within a very wide range, from values lower than 10^{-4} sec to 1 sec and higher; b) for the majority of the crystals investigated, the line of the photocurrent drop is a sufficiently smooth curve with an almost rectilinear starting section of 10-percent; at lower temperatures, a characteristic break of the curve was observed on all those samples which have a large number of traps; within the room temperature range, the starting section of the line of drop is usually curved; c) as a rule, an increase in the time of photocurrent drop takes place in the case of a decreased lighting; the lower the temperature of the sample, the more intense will be the increase in the time of the drop; at rather high temperatures, a decrease of τ [ABSTRACTOR'S NOTE: τ stands for photoconductivity] takes place with the decrease of lighting on certain samples; d) it is shown that the times of the photocurrent drop measured under quasistationary conditions with a high illumination of the samples with white light (10^{18} $\frac{\text{quants}}{\text{cm}^2 \text{ sec}}$) correspond essentially to the lifetimes of the photoelectrons in a free state;

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A151/A029

Investigation of the Times of Decrease of the Photocurrent in CdS Single Crystals at Various Temperatures and Lighting Conditions

In the case of a weak illumination (10^{13} - 10^{14} $\frac{\text{quants}}{\text{cm}^2 \cdot \text{sec}}$) the temperature dependence in the times of the photocurrent drop is chiefly determined by the concentration and the energy distribution of local levels within the forbidden zone; e) the investigation of the photoconductivity drop under pulse conditions makes it possible to eliminate to a certain extent the distorting effect of the traps on the times of the photocurrent drop which is observed in the CdS single crystals; f) the experiments conducted lead to a conclusion showing in which cases the traps do not essentially affect the time of the photocurrent drop. In closing, both authors express their appreciation to V.Ye. Lashkar'yov, Professor and Academician of the AS of UkrSSR, for his attention and valuable advice given in accomplishing this work. There are 8 figures and 7 references: 1 Soviet, 3 English and 3 German.

ASSOCIATION: Instytut fizyky AN URSR (Institute of Physics, AS Ukr SSR)

SUBMITTED: June 17, 1959

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25567

S/185/60/005/002/002/022
D274/D304

9,4177

AUTHORS: Sal'kov, Ye.A., Fedorus, G.A. and Sheynkman, M.K.

TITLE: On the role of contacts in the effects of photoactivation and infrared extinction of photoconductivity in CdS single crystals

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 5, no. 2, 1960, 141-148

TEXT: The question is examined whether the peculiar features of photoconductivity of CdS single crystals are properties of the semiconductor or whether (and to what extent) they belong to the contact between semiconductor and metal. Photoactivation and infrared extinction were studied on CdS single crystals with ohmic (strongly anti-depletion) contacts, obtained by applying melted In or Ga to the surface, and on specimens with depletion contacts, obtained by Al-spraying of the unprocessed surface. The main result of the experiments was that the investigated effects are related to the semiconductor itself, and not to the contacts. Fig. 3 shows a block-

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On the role of contacts...

diagram of the measuring device. A variable voltage was applied to the specimen, of frequency 100 kc and amplitude 1.65 v. With given parameters of the circuit, capacitance of specimens equal to 0.1 pFar., and ohmic contacts, no dependence whatsoever of the photocurrent on the frequency of the applied voltage was observed even at frequencies of 200 kc. In studying the photoactivation, the specimen was simultaneously illuminated from both monochromators. The light from one monochromator was modulated, whereas the light from the other was fixed. The dependence of the photocurrent-amplitude on the light-intensity was measured at both constant and variable (100 to 200 kc) voltages). The displacement of the photocarriers in the specimens did not exceed, as a rule, 1/40 of the distance between the electrodes (which was 2mm) when a variable voltage (100 kc) was applied. Hence the effects observed in this case were not related to contacts. Constant-voltage measurements were carried out on more than 20 specimens with different contacts; the ordinary method of measurement was used. V.E. Lashkarev, Ye.A. Sal'kov, G.A. Fedorus, M.K. Sheynkman (Ref. 11: UFZh, 2, 261, 1957; 3, 207, 1958; DAN SSSR, 114, 1203, 1957). The spectral distribution

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On the role of contacts...

of infrared extinction of the photocurrent on ohmic specimens is not dependent on the frequency of the applied voltage (from 0 to 200 kc). The lux-ampere relationship, the kinetics of the photocurrent, the photoactivation, and the infrared extinction are related to the semiconductor and not the contacts. Hence the assumption formulated by various authors is correct; among these: A. Rosa (Ref. 6: Proc. IRE, 43, 1850, 1955) and R.H. Bube (Ref. 7: Phys. and Chem. Solids, 1, 234, 1957). Photoactivation and extinction were observed at both constant and variable voltage. Whereas in ohmic specimens the photocurrent does not depend on the frequency, the photocurrent in non-ohmic specimens is frequency-dependent. In the case of non-ohmic (depletion) contacts, the effects measured at constant voltage give results entirely different from measurements at variable voltage. Photoactivation is often observed at variable voltage only, and not at constant. Hence measurements of photocurrent characteristics on ohmic specimens permits determining the internal and surface properties of semi-conductors, whereas measurements on specimens with depletion contacts - determination of the properties of the contacts. The frequency characteristic of the

On the role of contacts...

photocurrent in specimens with depletion contacts apparently corroborates the assumption of "sluice" formation at such contacts. There are 10 figures and 12 references: 8 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: R.H. Bube, Phys. Rev., 99, 1105, 1955; A.Rosa, Proc. IRE, 43, 1850, 1955; R.H. Bube, Phys. and Chem. Solids, 1, 234, 1957; I. Lambe, Phys. Rev., 98, 985, 1955.

ASSOCIATION: Instytut fizyky AN USSR (Physics Institute, AS Ukr SSR)

SUBMITTED: July 3, 1959

Fig. 3 Legend: 1 & 2 - monochromators;
3 - sinusoidal voltage generator;
4 - millivoltmeter; 5 - amplifier;
6 - rectifier; 7 - oscillograph;
8 - specimen

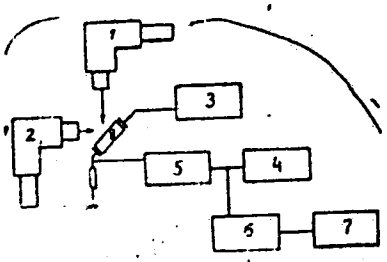

Рис. 3.

Card 4/4

9.4177 (1138)
26.2421 also 3110

27279 S/181/61/003/008/009/034
B102/B202

AUTHORS: Marchenko, A. I., Sal'kov, Ye. A., Fedorus, G. A., and Fursenko, V. D.

TITLE: Some properties of CdS single crystals with gold impurities

PERIODICAL: Fizika tverdogo tela, v. 3, no. 8, 1961, 2285 - 2292

TEXT: The authors present results of studies of the effect of gold impurities in CdS single crystals on the photosensitivity, the spectral distribution of the photocurrent, the thermostimulated current and other properties of these crystals. The authors used single crystals with low sensitivity to light and either high dark resistivity (insulators, $\varrho \geq 10^{10}$ ohm·cm) or low dark resistivity (conductors, $\varrho = 10^{5}$ ohm·cm). The gold impurity was diffused-in since both gold impurities and annealing process affected the crystal properties. Preliminary studies showed that in order to be able to study the impurity effect separately, the specimens must be heat-treated (550°C, 2.5 hr) before diffusing in the impurities. The spectral photocurrent distribution was recorded by a УМ-2 (UM-2) monochromator the maximum intensity of the monochromatic

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light source (λ = 510 mμ) was $5 \cdot 10^{13}$ quanta/sec·cm^2. After the initial attenuation of the photocurrent the relaxation time of the photocurrent was determined by means of an ЭНО-1 (ENO-1) oscilloscope. The following results were obtained when studying the effect of gold impurities on the integral photosensitivity: Dark conductivity increases only slightly with increasing gold content. It attains saturation with high gold content. In this case the photosensitivity is increased by about 100 times as compared to the initial value. A separate study of the effect of annealing and of the gold impurity showed that annealing inconsiderably increased the dark conductivity of the "insulating" crystals, but strongly reduced that of the "conductive" crystals. If gold was added to the annealed specimen, dark conductivity was slightly increased in both cases. The following results were obtained when studying the effect of gold on the sensitivity to X-ray and gamma radiation:

Crystal	I_{dark}, a	$I_{x\text{-ray}}$, a	I_{γ}, a
	100 volts		
CdS, pure, annealed	10^{-12}	10^{-9}	10^{-8}
CdS, annealed, +Au	10^{-11}	$2.3 \cdot 10^{-7}$	10^{-6}

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Some properties of...

Co^{60} (300 mcuries) served as gamma source, the X-ray source was an X-ray tube with Cu-anticathode of the device УРС-25М (URS-25I). The photosensitivity at a voltage of 50 v applied to the crystals was 1a/lumen. Table 4 gives further numerical data. The studies of the effect of gold on the spectral distribution of the photocurrent $I_{ph}(\lambda)$ showed that the shape of the curve is maintained (see Fig. 1). The results of the study of the effect of gold on thermostimulated photoconductivity (made by A. P. Trofimenko) are shown in Fig. 2. Finally, the authors studied the effect of infrared quenching of the photocurrent. The alloyed specimens showed two maxima of infrared quenching: at 0.95 and at 1.4 μ. With non-alloyed specimens the first maximum was at 0.9 μ. This shift is due to the existence of two infrared absorption mechanisms. The results of the studies are summarized as follows: 1) The gold impurities increase the sensitivity of the CdS single crystals to light, gamma and X-radiation. 2) The increase of photosensitivity is related to an increase in the lifetime of the photocurrent carriers. 3) In the entire spectral range of photosensitivity of CdS gold has a stimulating effect without changing the shape of the spectral characteristics. 4) In CdS the gold atoms do not form new levels for the electron capture in the energy

interval 0.005 - 0.5 ev. The increase of the area within the curve of thermostimulated conductivity is due to an increase of the lifetime of the free photoelectrons. 5) Gold impurities do not influence the energetic position of the bands of infrared quenching of the photocurrent. The authors thank Academician AS UkrSSR V. Ye. Lashkarev for interest and M. K. Sheynkman for discussions. There are 4 figures, 4 tables, and 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut poluprovodnikov AN USSR, Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: February 20, 1961

35103

S/185/62/007/001/013/01.
D299/D302

9.4177
26.2420

AUTHORS: Fedorus, G.A., and Fursenko, V.D.

TITLE: Effect of copper impurities on photoelectric properties of CdS single crystals

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 1, 1962, 82 - 83

TEXT: The copper was applied to the crystal surface by the diffusion method. The prepared single crystals with the applied copper layer were annealed in a vacuum (at 600°C) for 2 - 2.5 hours. The copper layer was 0.03 μ thick. The electrodes were made of galium. Comparative measurements were taken of the integral photosensitivity, the relaxation time of the photocurrent, and the spectral- and lux-ampere characteristics of clean CdS single-crystals and of the single crystals with the impurity -- CdS (Cu). The relaxation time of the photocurrent was measured by means of oscillograph ЭНО-1 (ENO-1), the spectral characteristics - by monochromator УМ-2 (UM-2). A table shows the mean values (obtained from a lot of 25 specimens) of the relaxation time τ^{o} and of the integral photosensitivi-

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ty. It was found that the copper impurity has a considerable effect on τ^0, reducing it by over one order of magnitude. The integral photosensitivity decreases, too. The spectral distribution of the photocurrent and the lux-ampere characteristics are also considerably affected by the copper impurity. The dependence $I_{ph}(L)$ (L denoting the luminance) is linear in the case of CdS(Cu) single-crystals, whereas for clean CdS single-crystals they are not linear. The relaxation time τ^0 of CdS (Cu) single-crystals increases with the intensity of illumination, whereas for clean crystals it decreases with increasing intensity. Conclusions: The copper impurity in the CdS single-crystals has a considerable effect on the recombination of free electrons. It is possible that this mechanism involves the creation of new short-lifetime recombination centers by the copper impurity. There are 2 figures, 1 table and 2 Soviet-bloc references.

ASSOCIATION: Instytut napivprovidnykiv AN URSR (Institute of Semiconductors AS UkrRSR), Kyyiv

SUBMITTED: August 10, 1961

Card 2/2

39614
S/194/62/000/004/041/105
D201/D308

9.4160

AUTHORS: Sal'kov, Ye. A. and Fedorus, G. A.

TITLE: CdSe monocrystal photoresistances having a short relaxation time

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 4, 1962, abstract 4-4-6K (V sb. Fotoelektr. i optich. yavleniya v poluprovodnikakh, Kiev, AN UkrSSR, 1959, 373-376)

TEXT: The properties of CdSe monocrystals, subjected to various methods of thermal processing producing short relaxation times of the photocurrent (I_p), were investigated. The annealing was carried out for 30 min. at 650°C, in a continuously evacuated (10^{-4} mm Hg) quartz cylinder. Specimens having dark resistance 0.1 - 100 ohm.cm and not noticeably photo-sensitive were subjected to annealing. The annealed crystals, with average dimensions 8 x 2 x 0.2 mm, were glued with БФ-4 (BF-4) glue onto a mica base. The electrodes were

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CdSe monocrystal ...

of fused Ga deposited at opposite sides of the crystal. The specimen thus prepared had a specific dark resistance of 10^9 - 10^{10} ohm. cm and a photosensitivity of 0.3 - 0.5 A/lum at a voltage of 35 V applied to the specimen. No maximum, characterizing the given type of crystals, was observed at the curve of spectral photosensitivity response. A super-linearity of I_p was observed at an illumination of annealed specimen less than 25 lux. At 25 - 100 lux the I_p increased linearly, reaching a value of 30 μA at 100 lux. The frequency characteristics of photoresistances were taken at sinusoidally varying white light illumination within a frequency range 0 - 10^6 c/s. The frequency at which the amplitude of the alternating signal dropped by 50% was 10^4 c/s for annealed CdSe photocells and 10^2 c/s for CdS ones. The specific time of the photoeffect is less than 10^{-4} sec for annealed CdSe photocells. This is about 100 times less than the same for CdS photocells and 10 times less than that of the non-annealed CdSe photocells. No fundamental dependence of the I_p.

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CdSe monocrystal ...

relaxation time on light intensity was observed in annealed CdSe photocells. It followed that the frequency response did not deteriorate at small light fluxes (10^{11} quant/sec), the effect observed in CdS and CdSe photocells not specially processed. It is noted that changes, introduced by the described thermal processing into the photoelectric properties of CdSe monocrystals, are irreversible. The CdSe photoresistances with short relaxation time may find an application in quick response installations of photoelectric automation. 5 references. [Abstracter's note: Complete translation.]

Card 3/3

S/058/62/000/006/088/136
A057/A101

24.2600

AUTHORS: Pivtoradni, N. I., Fedorus, G. A.

TITLE: Peculiarities of photoconducting CdS_xCdSe_{1-x} single crystals ($x < 1$)

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 37, abstract 6E300 (In collection: "Fotoelektr. i optich. yavleniya v poluprovodnikakh". Kiyev, AN USSR, 1959, 85 - 94)

TEXT: Photoelectric characteristics of CdS_xCdSe_{1-x} single crystals ($x < 1$) (spectral dependencies of the photocurrent, natural time of photocarriers, quantum yield of the photocurrent, transmission coefficient of light, and lux-ampere characteristics) were studied experimentally in dependence of the per cent content of the components. The investigated crystals were obtained by sublimation of a powdered CdS_xCdSe_{1-x} mixture of a given composition. It is demonstrated that the long-wave edge of the band of internal absorption in mixed crystals depends linearly upon the content of the components. The position of the maximum of photosensitivity λ_{max} is shifted in correspondence to the shift of the edge of internal absorption, where in mixed single crystals the characteristic σ-figurativeness

Card 1/2

S/058/62/000/006/088/136
A057/A101

Peculiarities of...

of the spectral characteristic is absent and at $\lambda < \lambda_{max}$ these crystals have a greater photosensitivity than CdS and CdSe. It is demonstrated that the form of the spectral curve of photosensitivity of mixed crystals is determined by the dependence of the value of quantum yield of the photocurrent upon the wavelength. The relaxation of the photocurrent occurs by a complicated law, close to the hyperbolic one, characterized by a series of momentary natural times. It is also demonstrated that the mixed crystals are photosensitive to the ultraviolet, X-rays and gamma-rays.

V. Sidorov

[Abstracter's note: Complete translation]

Card 2/2

FEDORUS, G.A. [Fedorus, H.A.]; FURSENKO, V.D.

Effect of copper impurities on the photoelectric properties of CdS monocrystals. Ukr.fiz.zhur. 7 no.1:82-83 Ja '62. (MIRA 15:11)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.
(Photoelectricity)
(Cadmium sulfide crystals—Electric properties)
(Copper)

L 18024-63 EWT(l)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3 JD/JG
ACCESSION NR: AP3003873 S/0181/63/005/007/1805/1813

AUTHORS: Trofimenko, A. P.; Fedorus, O. A.; Reynkman, M. K.

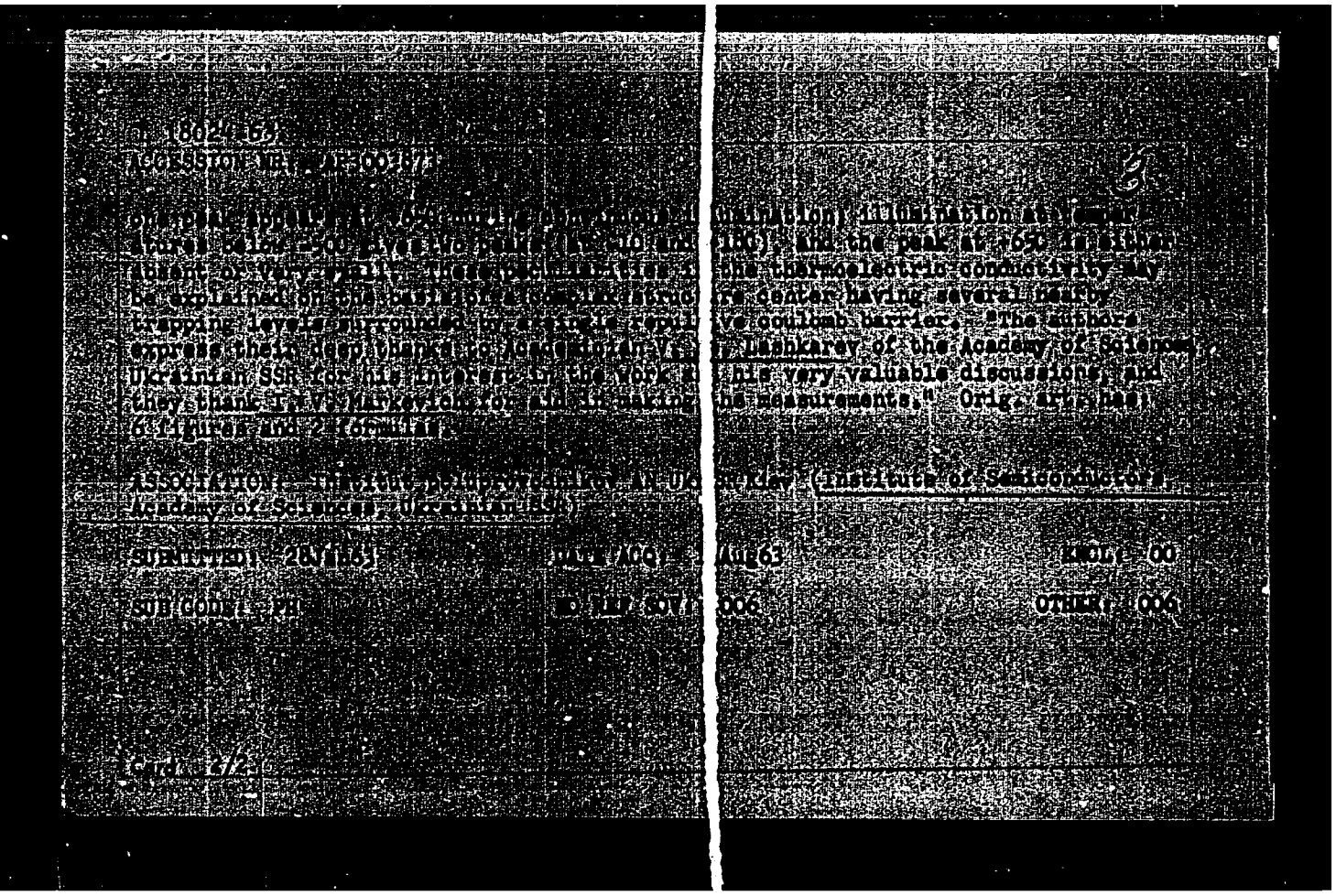
TITLE: Dependence of thermoelectric conductivity on illumination conditions for single crystals of CdS treated in sulfur fume

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1805-1813

TOPIC TAGS: thermoelectric conductivity, illumination, Cd, S, fumes, coulomb barrier, activation energy, sulfur, cadmium

ABSTRACT: In their investigation the authors varied the temperature, duration, and conditions of illumination (samples cooled to test temperature during uninterrupted illumination, or cooled to test temperature in darkness and then illuminated). In the region of -100 to -85C, the maximums of thermoelectric conductivity observed at -10 or -160 with a duration of 20 sec depend exponentially on the test temperature of the sample. They have activation energies ranging from 0.7 to 1 ev, depending on the sample. The dependence of the thermoelectric current on the duration of illumination proved to be exponential, varying as the 3rd to 4th power of the duration. The authors discovered that the position of thermoelectric-current peaks depends on the conditions of illumination; only

Card 1/2



BDS

ACCESSION NR: AP3000240 S/0185/63/008/005/0598/0599

AUTHOR: Arkhipova, A. M.; Fedorus, G. A.; Fursenko, V. D. 46

TITLE: Investigation of the phenomenological quantum yield from the photoconductive effect in the CdS single crystal

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 8, no. 5, 1963, 598-599

TOPIC TAGS: cadmium sulfide crystal, phenomenological quantum yield, cadmium sulfide photoresistor

ABSTRACT: The relation between phenomenological quantum yield (PQY) and the intensity of constant bias lighting in a wide range of specimen illuminations by short light pulses has been experimentally investigated by measuring the photo response. The experiments show that the PQY for specimens with low dark conductivity (10^{-10} mho) increases with bias lighting, rises to a maximum, and then decreases at comparatively high bias lighting. The PQY for a specimen with a 10^{-7} to 10^{-6} mho dark conductivity decreases monotonically with an increase in bias lighting. The PQY for the majority of specimens varied within 0.01 to 0.02 electron/quantum. The authors conclude that the sensitivity threshold of CdS photoresistors can be increased either by adding certain impurities to the

Card 1/2

L 10788-63

ACCESSION NR: AP3000240

0

CdS single crystal or by treatment of the photosensitive surface of the crystal. "The authors express their thanks to Academician V. E. Lashar'ov for his valuable suggestions and interest in the work." Orig. art. has: 1 figure and 1 formula.

ASSOCIATION: Insty*tut napivprovidny*kiv AN URSR m. Ky*yiv (Institute of Semiconductors, AN URSR)

SUBMITTED: 01Feb63 DATE ACQ: 18Jun63 ENCL: 00

SUB CODE: PH NO REF SOV: 007 OTHER: 000

Card 2/2 mcs/cs

L 41513-65 EWT(m)/EWG(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) RDW/JD

ACCESSION NR: AP4043098 S/0185/64/009/007/0803/0805

AUTHORS: Komashchenko, V.K.; Marchenko, A.I.; Fedorus, G.A.

Photorectifying Cu-CdSe syste.

SOURCE: Ukrayins'ky*y fizy*chny*y zhurnal, v. 9, no. 7, 1964, 803-805

TOPIC TAGS: Cu CdSe system, photorectifier, CdSe monocrystal cadmium

ABSTRACT: A method was worked out for obtaining a photorectifying

heat treatment. The photoelement was constructed

sensitivity of the photoelement

sensitivity dropped slowly in the short wave portion of the spectrum. The integral sensitivity upon illumination with a tungsten lamp [illegible] microamps/lumen. The [illegible] characteristics of the photoelement obtained at different irradiation intensities of [illegible] lamp are shown in [illegible] the

[illegible] at about 6000 lux) and their inertia [illegible] the [illegible]. The photo-e.m.f. relaxation time was [illegible] sec. Photoelements of CdS monocrystals were similarly prepared, but their photosensitivity and their ability to convert solar to electri- [illegible] was much lower than that of the CdSe photoelements. "The [illegible], who [illegible], are interested in the work and valuable advice." Orig. art. has: 4 figures.

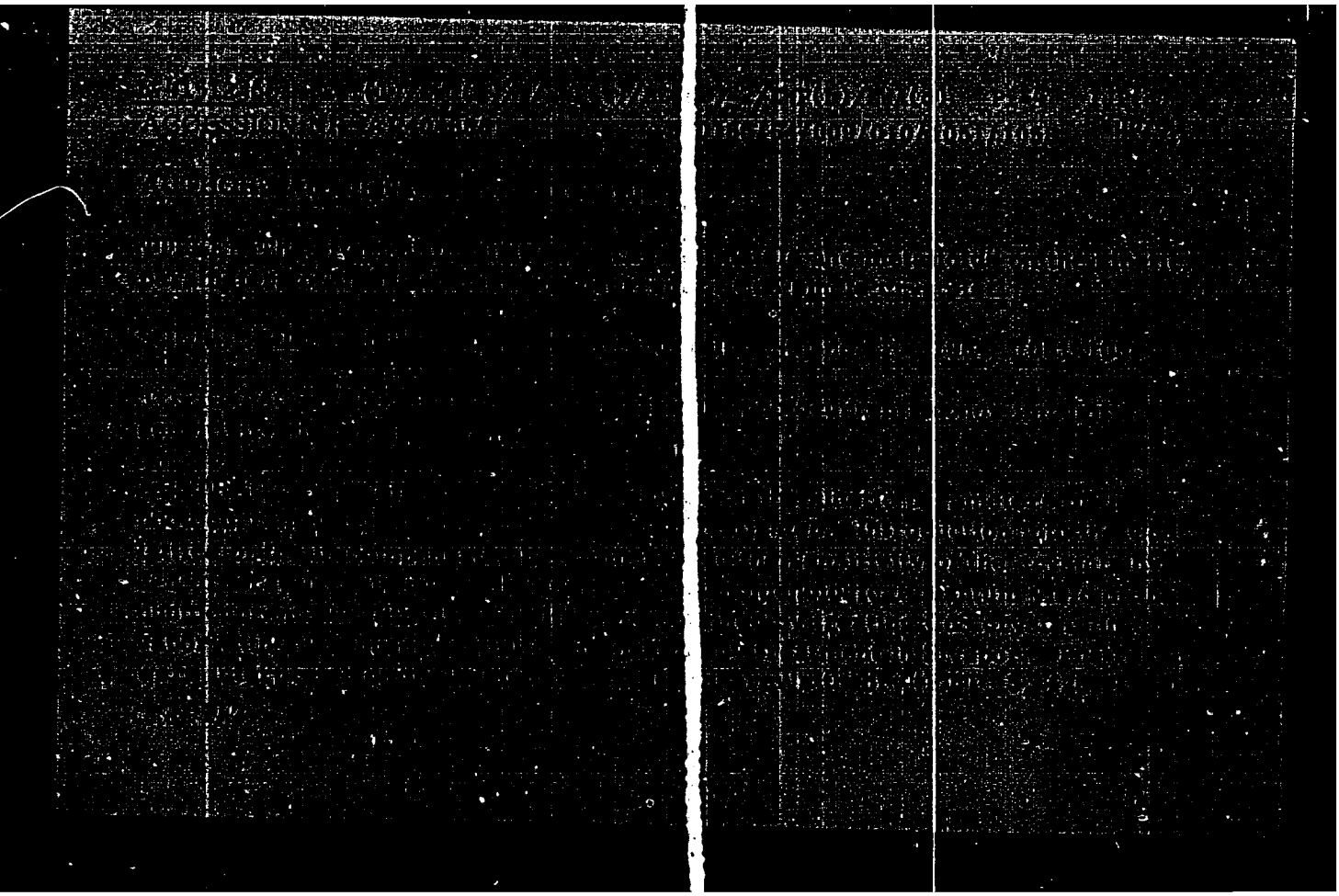
Card 2/5

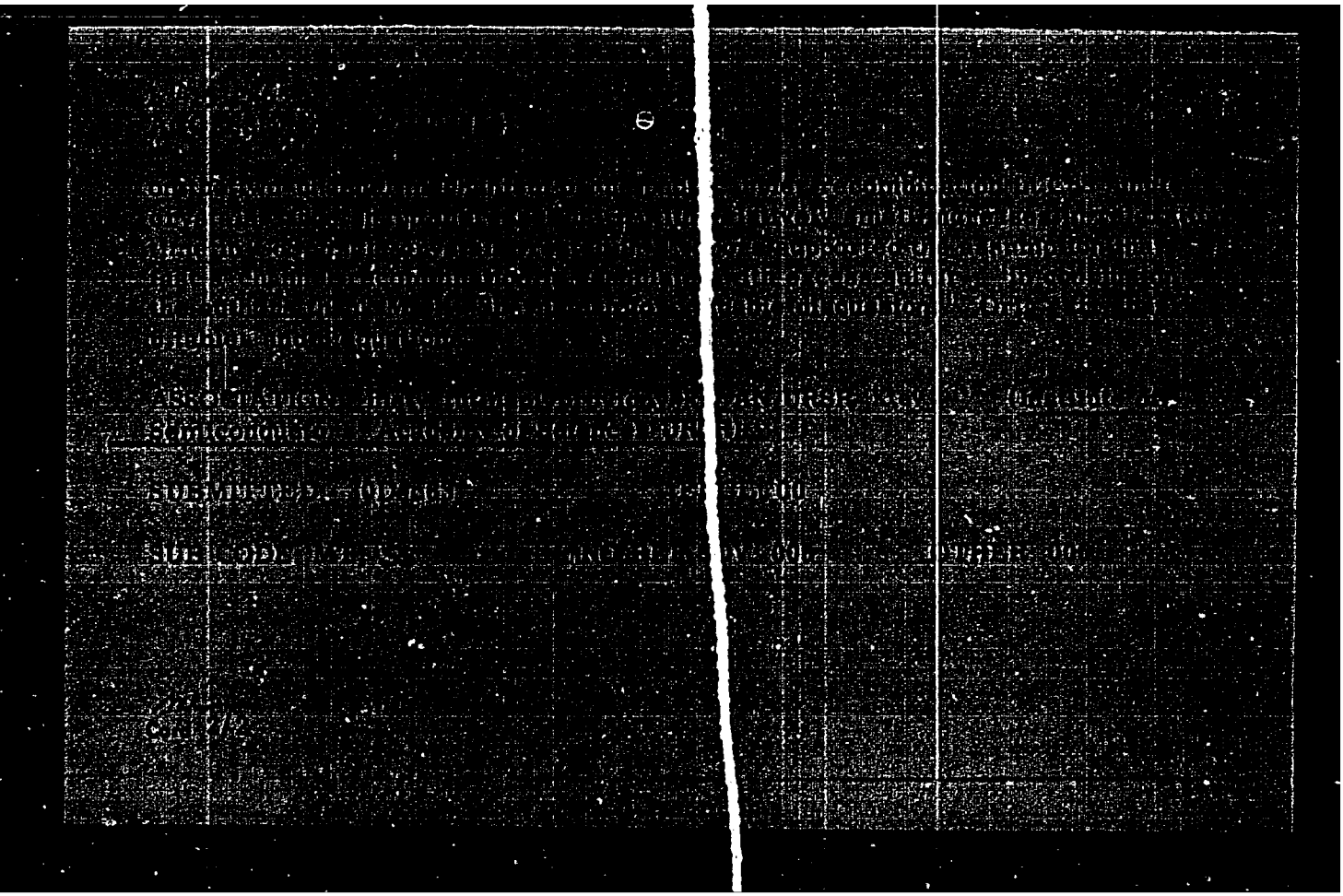
L 41513-65
ACCESSION NR: AP4043096

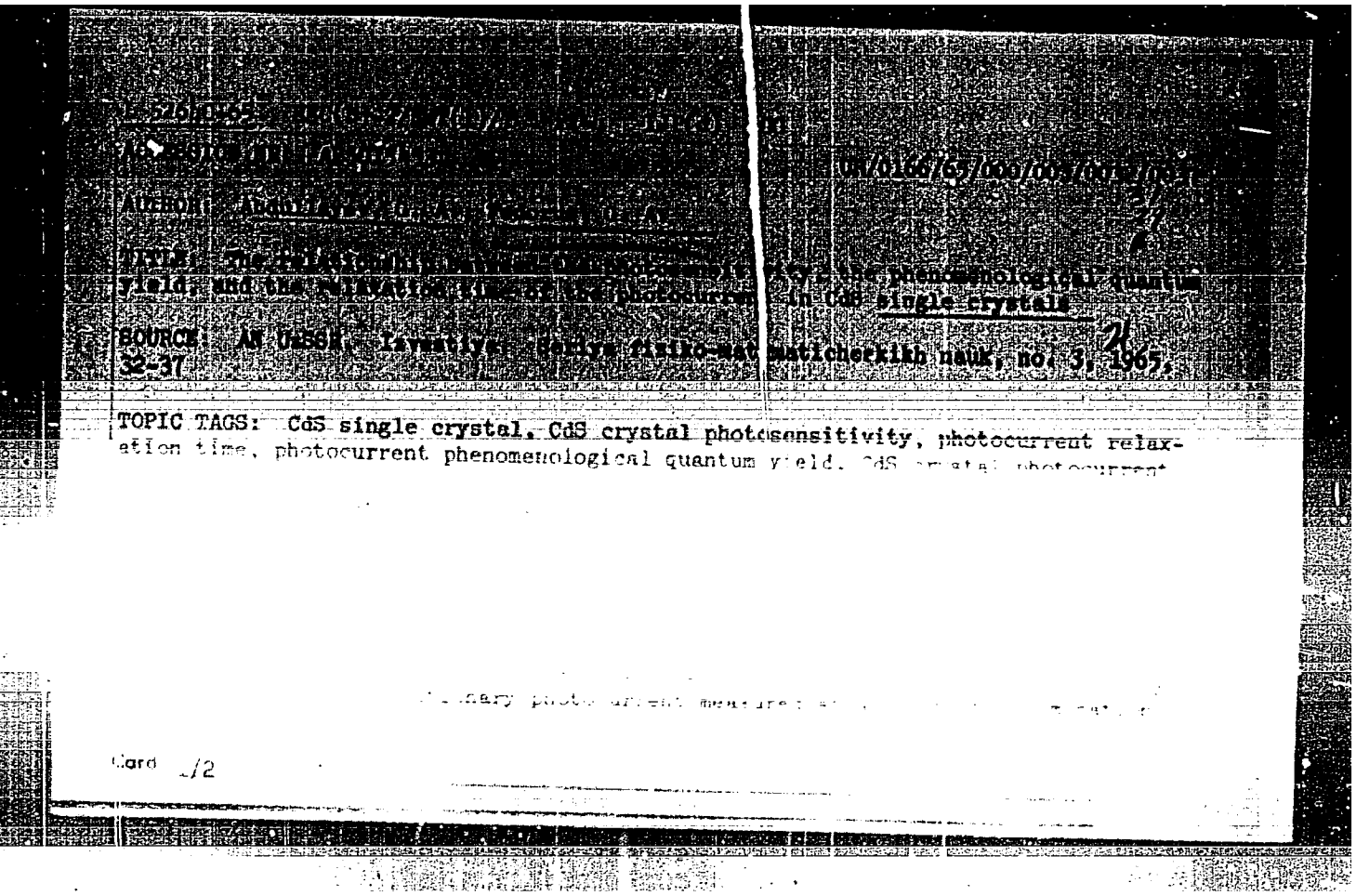
ASSOCIATION: Institut napivprovidnykiv AN URSR, Kiev (Institute of Semiconductors AN URSR)

SUBMITTED: 13Mar64 ENCL: 02

SUB CODE: OP, SS NR REF SOV: 000 OTHER: 003







yield; and the [illegible] in CdS single crystal

SOURCE: AN USSR, Izvestiya, Seriya fiziko-mat[illegible] Matichorikh nauk, no. 3, 1965, 32-37

TOPIC TAGS: CdS single crystal, CdS crystal photosensitivity, photocurrent relaxation time, photocurrent phenomenological quantum yield, CdS crystal photocurrent

[illegible] photocurrent [illegible]

Card 1/2

L 52640-65

ACCESSION NR: AP5015453

2

It was found that 1) the kinetic parameters of stationary photocurrent G_f and τ^0, which determine the photosensitivity of single CdS crystals, varied within a wide range for the investigated crystals (G_f from 1×10^{-2} to [illegible] x [illegible], [illegible] from [illegible] sec to [illegible] crystals with a higher [illegible] [illegible] larger [illegible] [illegible] identical [illegible] [illegible], and vice versa. Such an intercorrelation between τ^0 and G_f values in specimens having identical photosensitivity can be due to different relations between the parameters [illegible] recombination levels. Orig. art. has: [illegible] figures, [illegible] formulas, and [illegible] tables.

ASSOCIATION: Institut poluprovodnikov AN UkrSSR (Institute of Semiconductors, AN [illegible] Fizicheskiy institut AN UkrSSR (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 24Mar64 ENCL: 00 SUB CODE: SS

NO REF SOV: 007 OTHER: 001 ATD PRESS: 4019

Card 2/2

ABDULLAYEV, G.A.; FEDORUS, G.A.

Relation between photosensitivity, the phenomenological quantum yield, and the photocurrent relaxation time in GdS single crystals. Izv.AN Uz.SSR. Ser.fiz.-mat.nauk 9 no.3: 32-37 '65. (MIRA 19:1)

1. Institut poluprovodnikov AN UkrSSR i Fiziko-tekhnicheskiy institut AN UzSSR. Submitted March 24, 1964.

L 3104-65 EWT(l)/EWT(m)/EWP(t)/T/EEC(t)/EWP(b) Pz-6 IJP(c) JD/AT
ACCESSION NR: AP5004320 S/0185/65/010/001/0027/0038

34
31
B

AUTHOR: Luk'yanchikova, N. B. (Luk'yanchikova, N.B.); Markevych, I.V. (Markevich, I.V.); Fedorus, G.A. (Fedorus, G.A.); Shaymkman, M.K.

TITLE: Investigation of photocurrent noise of CdS single crystals with various contacts

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 10, no. 1, 1965, 27-38

TOPIC TAGS: cadmium sulfide, single crystal, photocurrent, noise spectrum, photoresponse spectrum

ABSTRACT: The contact noise of CdS single crystals equipped with various ohmic electrodes was investigated. Unlike in other studies, the contact noise was separated from the volume noise by using a probe method of noise measurement. The spectrum of the photoresponse to a weak sinusoidally modulated light of constant intensity was plotted simultaneously with the noise [illegible]

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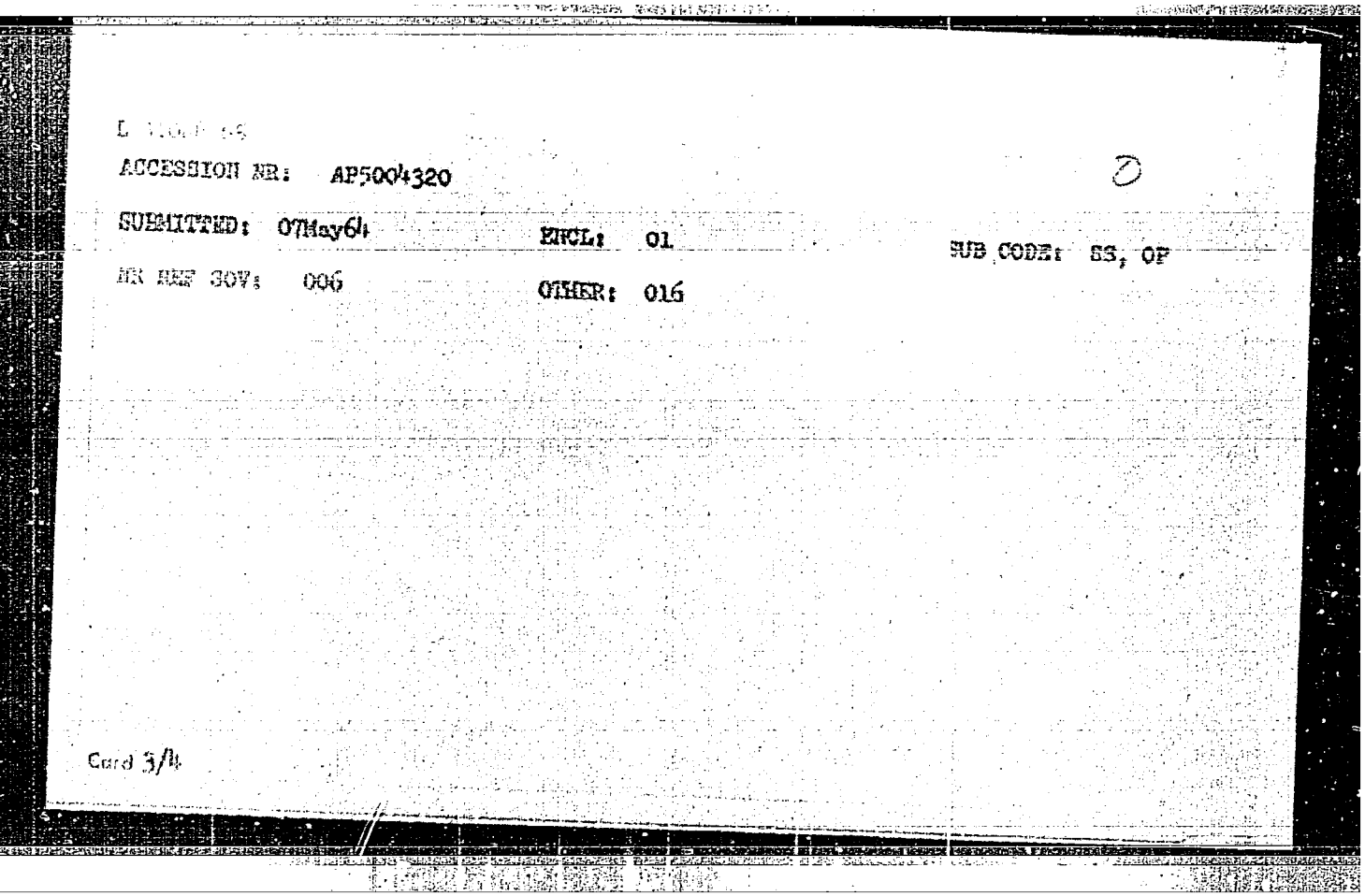
L 31048-65
ACCESSION NR: AP5004320

block diagram of the measurement set-up. The noise and photoresponse spectra were taken in the frequency range from 2 cps to 1 kcs. At 2 cps the equivalent noise impedance of the measuring set-up was 20 kilohms. The results indicate that it is possible to obtain noiseless ohmic contacts on thin and thick CdS single crystals either by welding-on indium or by cathode sputtering of cadmium. Other methods of contact preparation resulted in noisy contacts. The noise spectrum and the square of the photoresponse were found to differ from theoretical, and large values of $\Delta N^2/N \gg 1$ (N -- number of carriers in the sample, ΔN^2 -- fluctuation of this number) were observed, whereas ordinary theory yields $\Delta N^2/N = 1$. The measurements have shown that the value of $\Delta N^2/N$ is not connected with the quality of the contacts, since values both less than unity and appreciably larger than unity (for example, 500) were obtained. Many facts indicate that [illegible] the surface. The authors are [illegible] Academician V. Ye. Lashkar'ov for valuable remarks." Orig. art. has: 6 figures, 7 formulas, and 1 table.

ASSOCIATION: Instytut napivprovidnykiv AN UkrSSR, Kiev (Institute of Semiconductors, AN UkrSSR)

Card 2/4



L [illegible]

ACCESSION NR: AP5004320

SUBMITTED: 07May64 ENCL: 01 SUB CODE: SS, OP

NR REF SOV: 006 OTHER: 016

Card 3/4

L 31014-65

ACCESSION NR: AP5004320

ENCLOSURE: 01

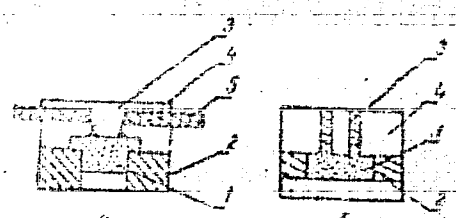


Fig. 1. Sections through measured samples with electrodes.

a - Thin single-crystal plates (up to 100 microns thick).

b - Thick single crystal (several mm).

1 - GdG single crystal, 2 - metal contacts, 3 - grease, 4 - mica, 5 - copper foil

Card 4/4

L 09334-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6029522 SOURCE CODE: UR/0432/66/000/004/0053/0055

AUTHOR: Kolezhuk, K. V.; Maystrenko, A. S.; Fedorus, G. A. (Candidate of physico-mathematical sciences) 57

ORG: None

TITLE: Pulse photoresistors made of cadmium-selenide single-crystals

SOURCE: Mekhanizatsiya i avtomatizatsiya upravleniya, no. 4, 1966, 53-55

TOPIC TAGS: photoelectric property, crystal growing, photoresistor, photoresistance, photoelectric cell, semiconductor single crystal, cadmium selenide, light pulse, light source / ISSh-100-2 light source

ABSTRACT: The photoelectric properties of CdSe single-crystals of a low photosensitivity were studied by the Semiconductor Institute of AN UkrSSR in connection with their eventual possible use as quick-response receivers of short light signals (10^{-6} to 10^{-5} sec). A method of growing crystals from the vapor phase was applied for preparation of CdSe crystals. The integrating photosensitivity did not exceed 10^{-4} to 10^{-5} amp per lumen at 28 volts. An In + Ga eutectic was used for electrodes and a linear volt-ampere characteristic was obtained in the range of 0.1 and 100 v. A pulse light source of ISSh-100-2 type was used for producing light pulses of the order of 2.10^{-6} sec. The photocurrent attained was 30 to 40 ma at 70 v. The exponential current attenuation curve had a time constant of 10^{-6} sec. Such a combination of a low-time constant and a high-percentage modulation of conductivity (10^{4} to 10^{6} times) will permit the exposure of the CdSe cells

Card 1/2 UDC: 621.383.42

to light radiations as well as the use of them under dark conditions. It is estimated that in the light such a percentage modulation can be maintained at a pulse frequency limit of 200 kc, while in the dark, the calculated limit is 3 kc. The photo-pulse response is characterized by the pulse front (about 1 microsecond) and relaxation time (5 to 15 microseconds) shown in an oscillogram of Fig. 1. The typical characteristics

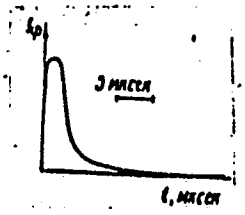


Fig. 1

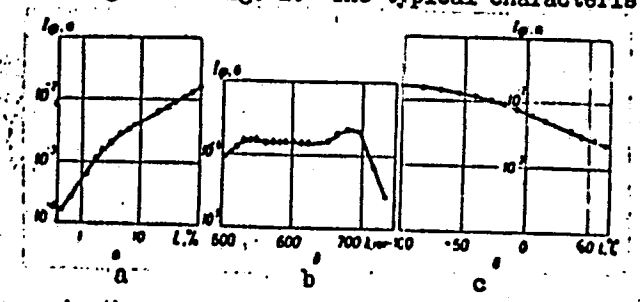


Fig. 2

obtained for CdSe photocells are shown in three curves of Fig. 2. The curve "a" represents a lux-ampere characteristic at 70 volts. The spectral characteristic is shown in the curve "b" while the third curve "c" demonstrates the dependence of the photo-current upon the temperature. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: None/ ORIG REF: 004

Card 2/2

L 41742-66 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6018044 SOURCE CODE: UR/0185/66/011/006/0686/0688

AUTHOR: Pavalets', S. Yu.; Fedorus, M. A.

ORG: Institute of Semiconductors, AN UkrSSR, Kiev (Instytut napivprovidnykiv AN URSR)

TITLE: Photo-emf of n-Cds - p-Cu_xS_y heterojunctions

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 11, no. 6, 1966, 686-688

TOPIC TAGS: junction diode, photodiode, cadmium sulfide, photoelectric cell, photoelectromotive force, energy band structure, conduction band

ABSTRACT: In view of the different points of view that have been used to explain the nature of the barrier produced between a layer of copper deposited over a CdS crystal (a procedure used to produce efficient photocells), the authors discuss the possibility that such a procedure results in a heterojunction, and describe a test of the properties of such a junction. The junctions were produced by sublimating CuS in vacuum on films or single crystals of CdS. The spectral distribution of the photoemf of the junctions was investigated using a UM-2 monochromator with an incandescent lamp and measured by a potentiometer method. The procedure used to prepare the CdS film is described briefly. Tests of different junctions prepared by different methods (CdS + Cu, CdS + S + Cu, and CdS + Cu_xS_y) have shown that deposition of copper on the CdS results, without any additional heat treatment, in heterojunctions of the type n-CdS - p-Cu_xS_y. Doping of both semiconductors with indium reduces the photoemf in the long-wave region (above 520 nm) and increases it for shorter wavelengths. The results

Card 1/2

ACC NR: AP6018044

are analyzed from the point of view of the energy band structures of the two substances and the effect of light quanta incident on the junction, and it is deduced that the heterojunction photo-emf is governed by the structure and splitting of the conduction band. As a result of the investigation it is also found that to obtain an efficient photocell by depositing copper on CdS it is advisable to precoat the CdS with a thin layer of sulfur. Maximum no-load emf is obtained by optimizing the thickness of the CdS film and by increasing the impurity content of both semiconductors. The method of sputtering CdS was developed at IP AN URSR by S. V. Svyechnikov. The authors thank Senior Scientific Worker Ye. A. Sal'kov for a useful discussion. Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 11Feb66/ ORIG REF: 001/ OTH REF: 004

ACC NR: AP6033585 SOURCE CODE: UR/0181/66/008/010/3133/3135

AUTHOR: Malyuk, N. P.; Fedorus, G. A.; Fursenko, V. D.; Shakh-Melikova, I. A.; Sheynkman, M.K.

ORG: Institute of Semiconductors AN UkrSSR, (Institut poluprovodnikov AN UkrSSR) Kiev

TITLE: Determination of the energy required to separate an electron-hole pair in CdS single crystals irradiated with electrons of energy 5 - 50 kev

SOURCE: Fizika tverdogo tela, v. 8, no. 10, 1966, 3133-3135

TOPIC TAGS: electron hole, electron energy, stimulated emission, electron bombardment, photoconductivity, electric conductivity, forbidden band

ABSTRACT: In view of the fact that earlier investigations have neglected the question of the energies required to produce or separate electron-holes, and knowledge of these energies is important in connection with the use of electron beams to produce stimulated emission in semiconductors, the authors have determined the electron-hole separation energy ε in single-crystal CdS bombarded with electrons of 5 - 50 keV energy. They were able to measure ε with sufficient accuracy only by using single crystals with a specific nonselective spectral photoconductivity characteristic obtained through special heat treatment. The method of determining ε is based on comparison of the stationary values of the photo- and electron-conductivity in the same crystal. The

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ACC NR: AP6033585

measurements were made in vacuum of 10^{-5} mm Hg at room temperature. The value of $3E_g$ ($E_g = 7.5 \pm 0.8$ ev is obtained in this manner for ε, which is found to be equal also to E_g fobidden band width). The same ratio of ε to E_g was obtained by others for a number of semiconductors and agrees with the approximate theoretical model proposed by W. Shockley. Orig. art. has: 1 figure and 1 formula.

SUB CODE: 20/ SUBM DATE: 19May66/ ORIG REF: 005/ OTH REF: 008

Card 2/2

ACC NR: AP7002668 SOURCE CODE: UR/0109/67/012/001/0098/0105

AUTHOR: Arkhipova, A. M.; Tkachuk, P. M.; Fedorus, G. A.

ORG: Institute of Semiconductors, AN UkrSSR (Institut polupsovodnikov AN UkrSSR)

TITLE: Threshold characteristics of CdS photoresistors

SOURCE: Radiotekhnika i elektronika, v. 12, no. 1, 1967, 98-105

TOPIC TAGS: photoresistor, photosensitivity, cadmium sulfide

ABSTRACT: The voltage and photosensitivity of CdS photoresistors was experimentally studied to establish the application of the photoresistors in recording weak alternating light signals. The 4 x 1-mm film specimens were prepared from CdS single crystals (50—100 μ thick) obtained by vapor-phase synthesis of Cd and S on a glass substrate. The noiseless contacts were made by vacuum deposition of indium on the ends of the specimens (the photosensitive area is 1 mm^2). The experiment shows that both high- and low-resistance photoresistors have a minimum sensitivity threshold [(3—6) x 10^{-10} lm cps $^{-1/2}$ (1.5—3) x 10^{-11} w cps $^{-1/2}$] at 1—10 lux illumination for a light source with a color temperature corresponding to 2854K. The sensitivity threshold for light pulses in the spectral range of CdS maximum sensitivity (λ = 0.51 μ) is 5 x 10^{-13} w cps $^{-1/2}$ at 10 lux white light illumination. The voltage

Card 1/2 UDC: 621.383.4

ACC NR: AP7002668

sensitivity of CdS photoresistors is 2—10 v/lm at 1 v d-c constant voltage. Orig. art. has: 6 figures, 1 table, and 3 formulas.

SUB CODE: 09, 20/ SUBM DATE: 13Jul65/ ORIG REF: 010/ OTH REF: 001/
ATD PRESS: 5112

Card 2/2

FEDORUS, I.

How we utilize our internal resources. Mias. ind. SSSR 32 no.4:10-12 '61. (MIRA 14:9)

1. Orskiy myasokonservnyy kombinat.
(Orsk--Meat industry--Equipment and supplies)

EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/WW/JG/AT

ACC NR: AP6022999 SOURCE CODE: UR/0185/66/011/004/0411/0415

101
99
B

AUTHOR: Fedorus, O. G.; Marchuk, P. M.

ORG: Institute of Physics, AN URSR, Kiev (Instytut fizyky AN URSR)

TITLE: Thermionic and absorptive properties of zirconium nitride in cesium vapor

SOURCE: Ukrayins' kyy fizychnyy zhurnal, v. 11, no. 4, 1966, 411-415

TOPIC TAGS: thermionic emission, zirconium, radiation effect, volt ampere characteristic, temperature dependence, ion emission, cesium, heat of evaporation

ABSTRACT: Thermionic emission and some other properties of zirconium nitride have been investigated in a cesium vapor atmosphere on cathode samples of metal powder. The coefficients of monochromatic and integral radiation were measured over a wide temperature range ($\varepsilon_\lambda = 0.53-0.42$ and $\varepsilon_t = 0.52 - 0.54$). The volt-ampere characteristics of vacuum and cesium diodes were taken. The temperature dependences of thermionic emission and the effective work function of

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L 44182-66

ACC NR: AP6022999

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zirconium nitride cathodes ($\varphi_a = 3.3 - 3.5$ ev) were determined. The emission of ions obtained on the contact ionization of cesium on a zirconium nitride surface was measured. The results of measurements are in good agreement with the Saha-Langmuir law. The heat of evaporation of cesium atoms and ions from the zirconium nitride surface (with degrees of coating close to zero, $\varphi_a = 2.4$) is estimated. The authors' thank L. H. Nikolayev for his x-ray diffraction analysis of the samples. Orig. art. has: 3 figures. [Based on authors' abstract] [NT]

SUB CODE: 20/ SUBM DATE: 10Jul65/ ORIG REF: 006/

Card 2/2

S/079/62/032/009/001/011
I048/I242

AUTHORS: Samsonov, G.V., Kosolapova, T.Ya., and Fedorus, V.B.

TITLE: Preparation of barium carbide

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 9, 1962, 2753-2755

TEXT: The following reactions leading to the formation of BaC_2 were investigated: (1) $BaO + 3C = BaC_2 + CO$ (2) $BaO_2 + 4C = BaC_2 + 2CO$ (3) $BaCO_3 + 3C = BaC_2 + CO$. When a mixture of $BaO + 3C$ was heated to 1000-1500°C no BaC_2 was formed because of the evaporation of BaO. On heating sintered bricks of $BaO_2 + 4C$, a reaction started at 1300° C, yielding a product with 2.22% combined C; the product formed at 1600°C contained 11.79% combined C, but the amount of combined C decreased when the reaction temperature was increased further. The weight losses increased with increasing reaction temperature up to 80-90% at 1800-1900°C. The yield of BaC_2 was 10-15%. Reaction (3), after 4 hours of heating at 1350°C, yielded a product containing 12.2% combined C; the presence of excess C (in the form of soot) had an irregular effect on the course of the reaction. In the presence

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I048/I242

Preparation of barium...

of 5% excess C, a product containing 14% combined C (i.e., with a composition approximately equal to the stoichiometric composition of BaC_2) was formed at 1350°, but the amount of combined C decreased with further increase in the amount of excess C. Both CO and CO_2 were found in the gaseous products of the reaction; this shows that the rate of dissociation of $BaCO_3$ at the experimental temperature used was higher than the rate of the reaction $CO_2 + C \rightleftarrows 2CO$. There are 3 tables.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk Ukrainskoy SSR (The Institute of Metal Ceramics and Special Alloys, Academy of Sciences of the UkrSSR)

SUBMITTED: September 23, 1961

Card 2/2